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official publication of the American Society of Hospital Pharmacists

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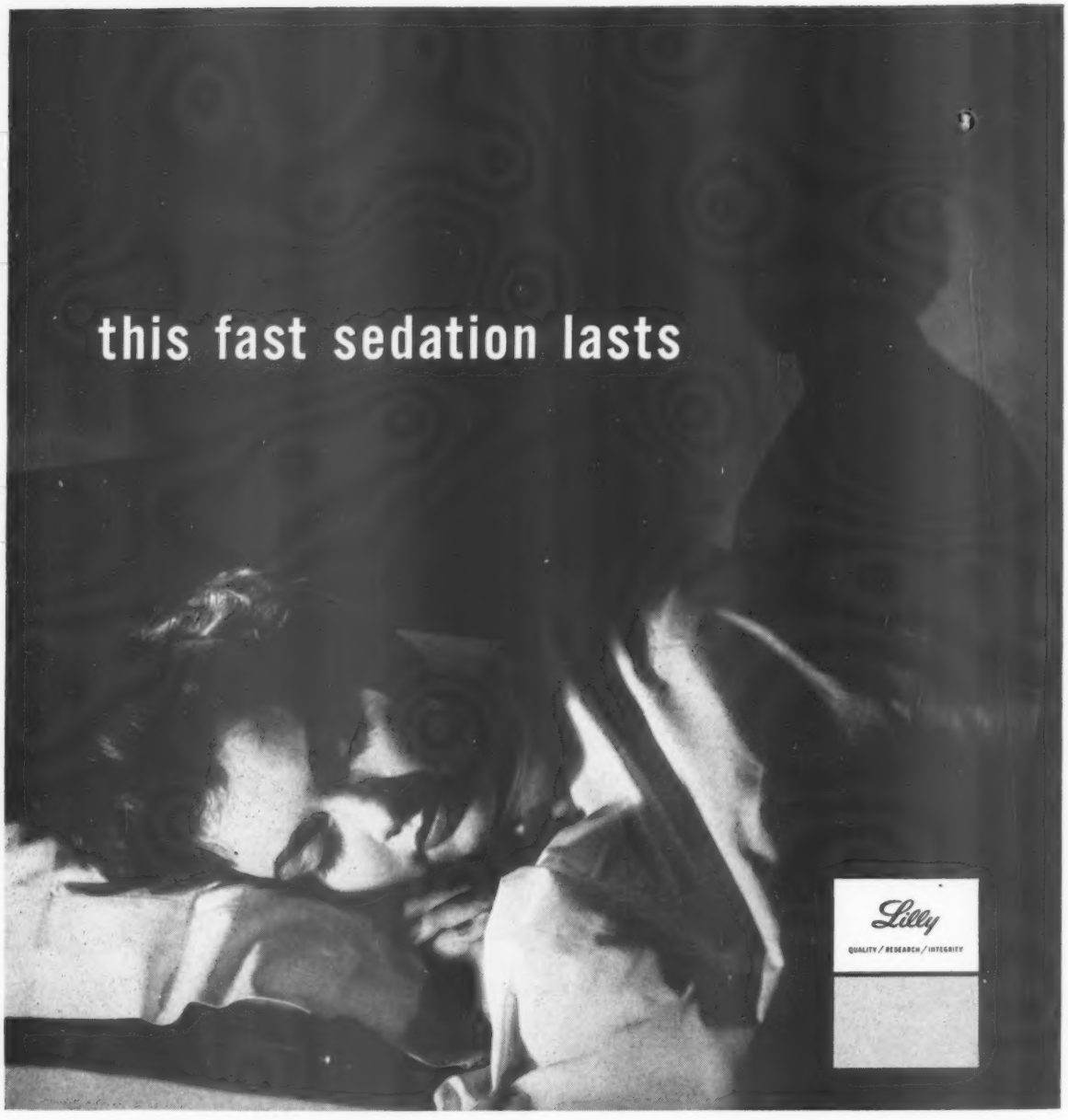

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American Journal of Hospital Pharmacy

American Society of Hospital Pharmacists

VOLUME 17 NUMBER 5 MAY, 1960

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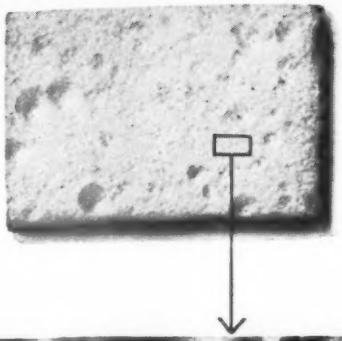

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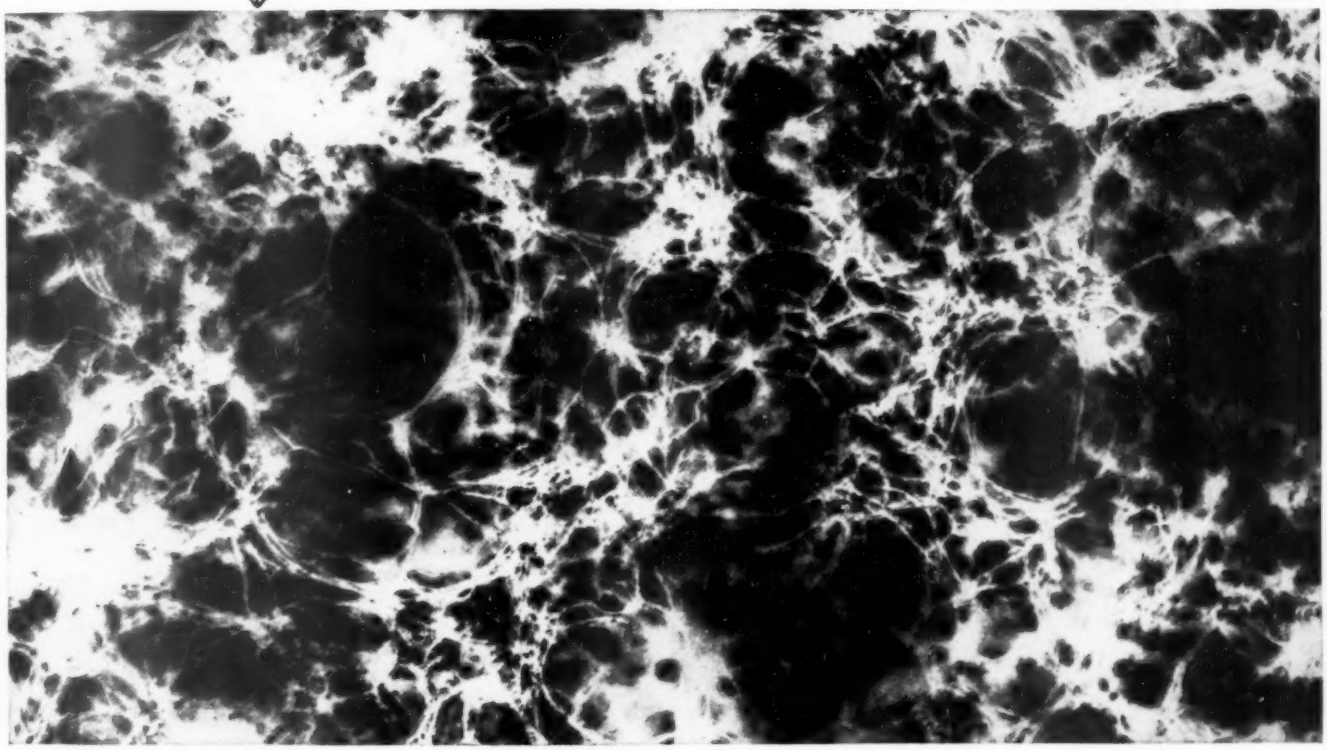

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Polydipsia	89	81.0
Weight loss	47	42.7
Polyphagia	28	25.4
Anorexia	16	14.5
Lethargy	14	12.7
Enuresis	7	6.4
Vomiting	5	4.5
Irritability	3	2.7
"Craving for sweets"	3	2.7
"Sticky diaper"	3	2.7
"Strong odor to urine"	2	1.8
Glycosuria	2	1.8
Hypoglycemia	2	1.8
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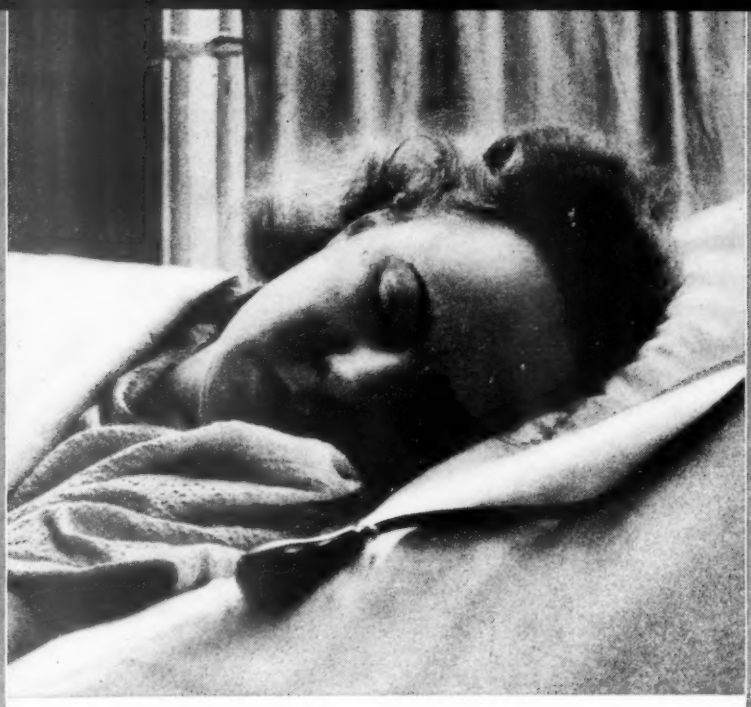

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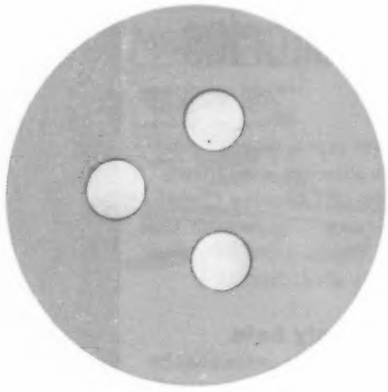

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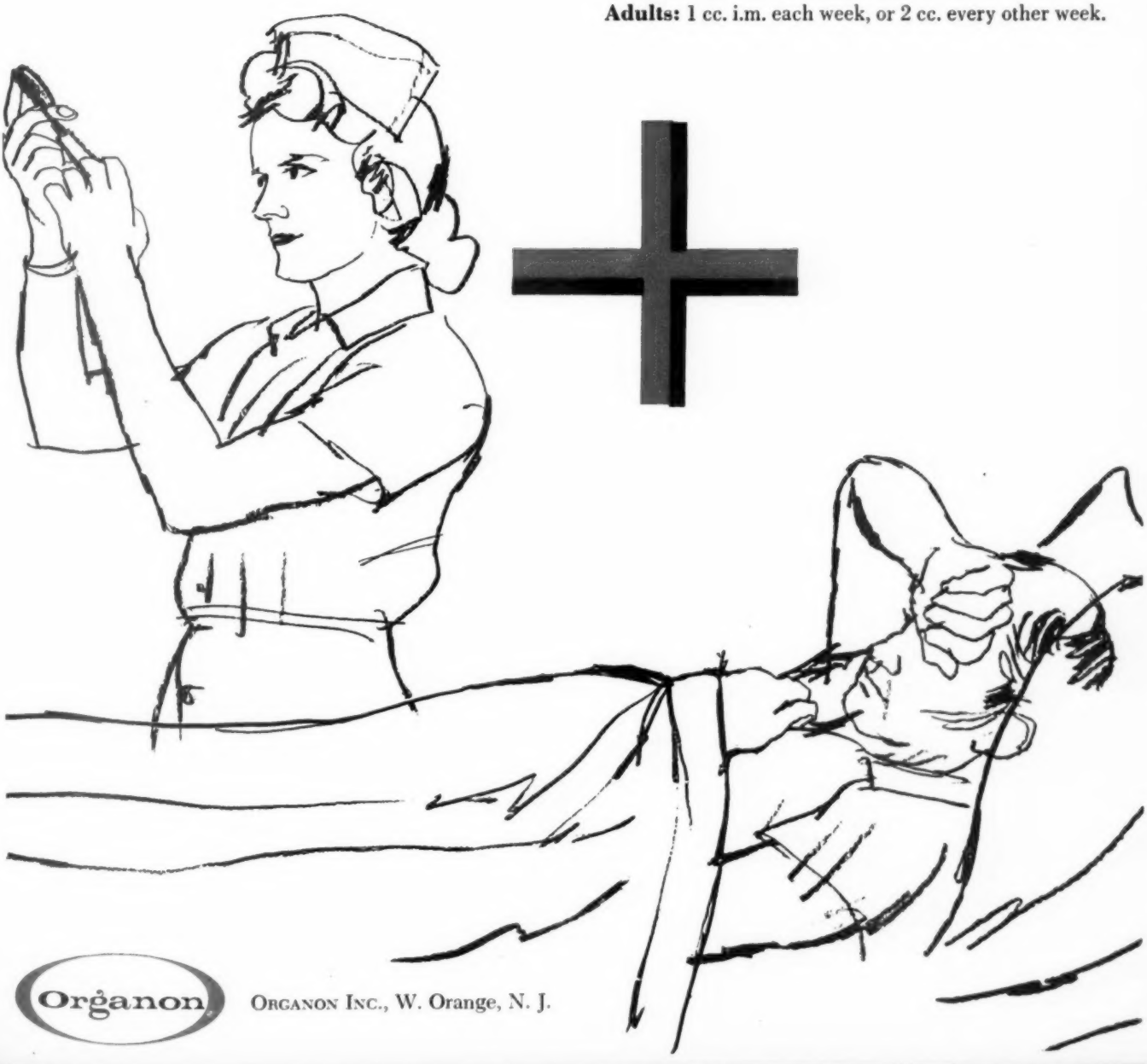

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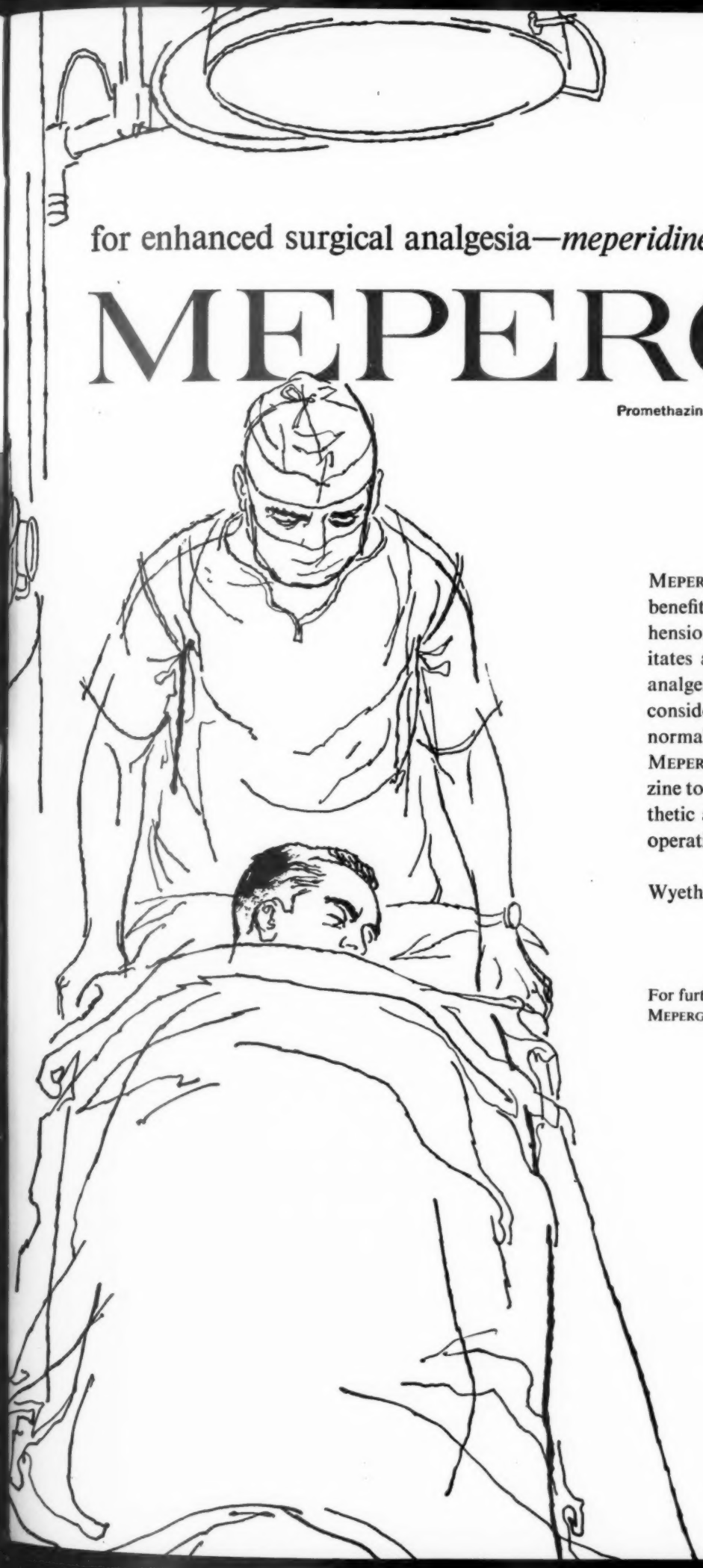

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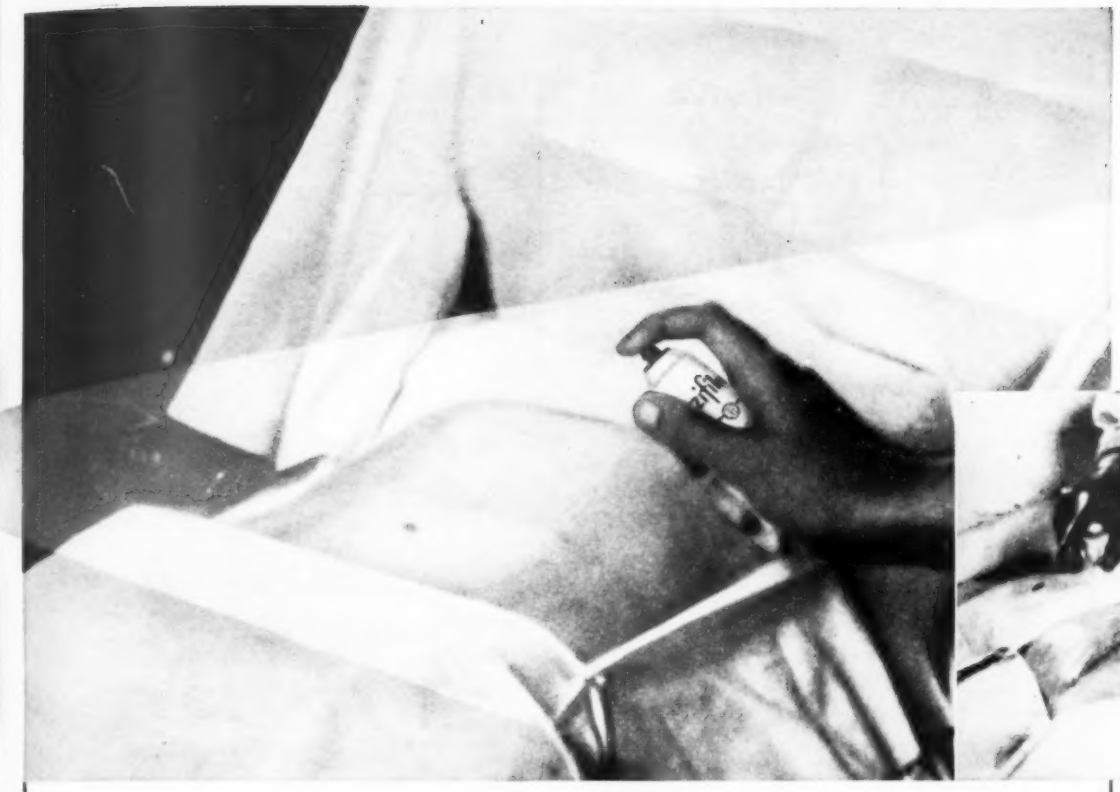

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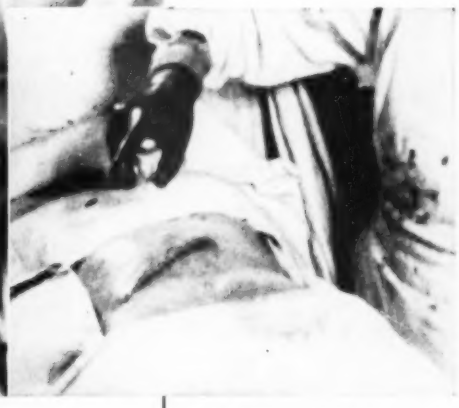

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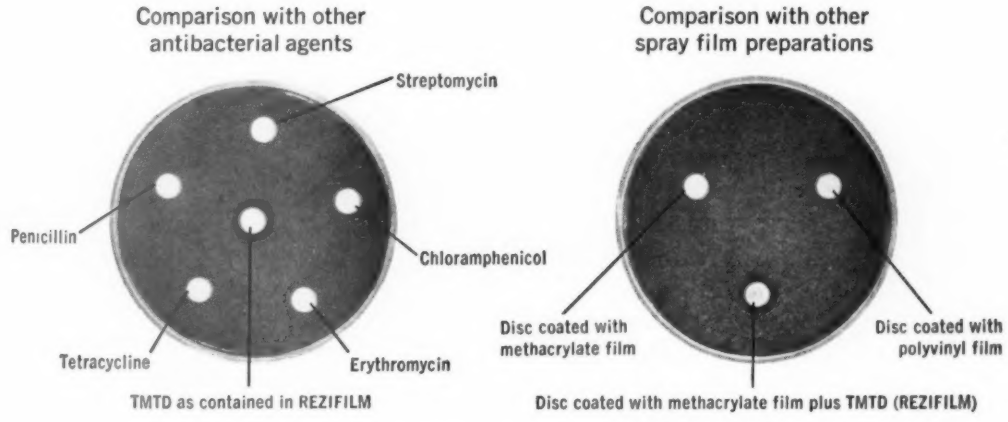

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References: 1. Eisenberg, G. M.: *Antibiotic Med. & Clin. Ther.*, 6:594 (Oct.) 1959. 2. Thomson, J. E. M.: Report to The Squibb Institute for Medical Research, June, 1957. 3. Maloney, J. V. and Mulder, D. G.: *Am. Surgeon* 23:388 (April) 1957. 4. Bucher, R. M.: Report to The Squibb Institute for Medical Research, July 3, 1957. 5. Hammond, J. A.: Report to The Squibb Institute for Medical Research, May 3, 1957. 6. Eisenberg, G. M.; Weiss, W.; Spivack, A. P.; Bassett, J. G.; Ferguson, L. K., and Flippin, H. F.: Adapted from Scientific Exhibit, A.M.A. Meeting, June 8-12, 1959.

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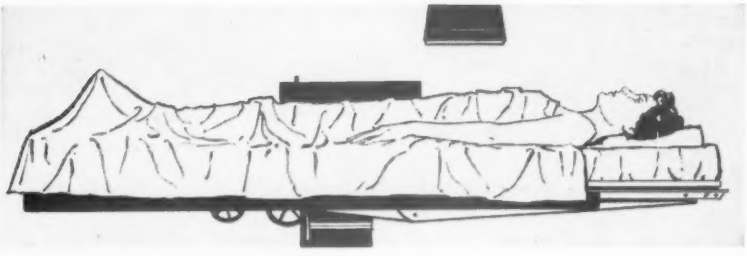

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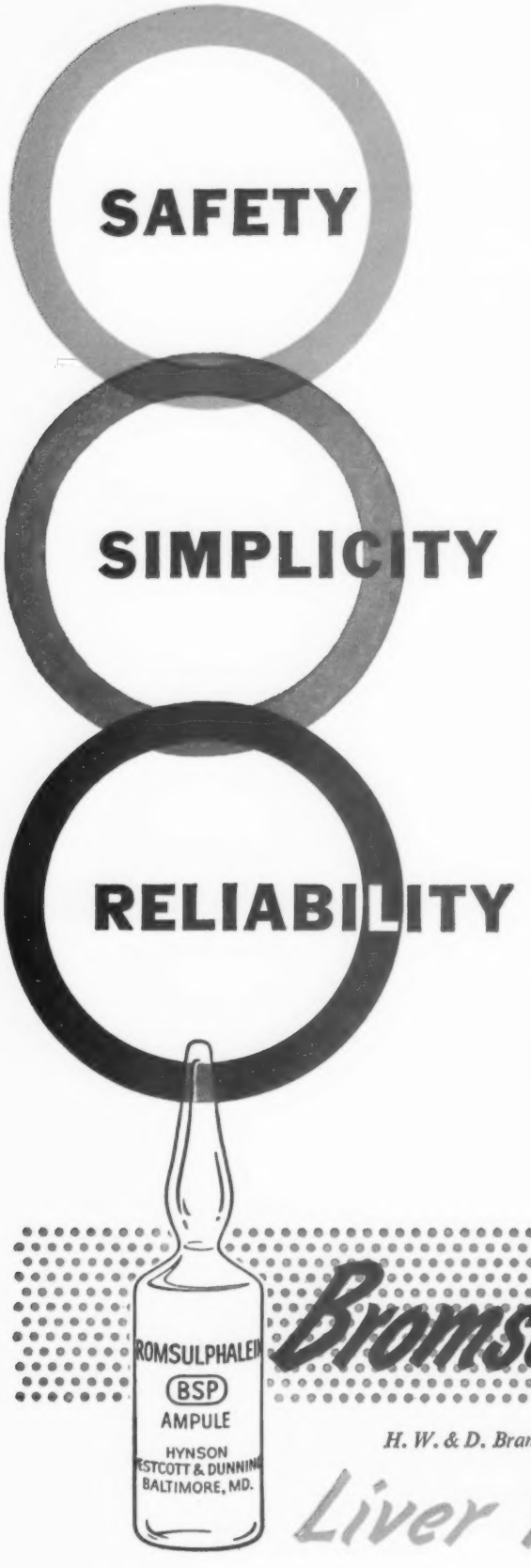

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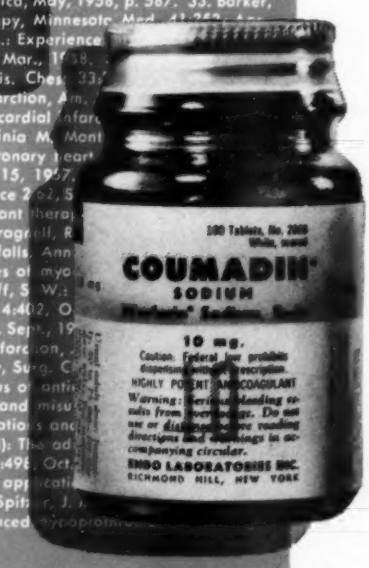

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Northern California Society

The regular meeting of the Northern California Society of Hospital Pharmacists was held on March 8 at Mills Hospital in San Mateo.

The speaker for the evening was Dr. Ralph Stinson, who told of his experiences during the past year when he substituted for a vacationing missionary doctor in Liberia. Movies taken by Dr. Stinson illustrated vividly the primitive state of the peoples and the tremendous problems arising in their medical treatment. He noted that penicillin is remarkably effective in post-surgical prophylaxis because of the absence of bacterial resistance found in the more civilized portions of the world.

Dr. Stinson closed his presentation by stating that the Episcopalian Church in Liberia would welcome any drug samples pharmacists would care to send.

Southern California Society

The February 10 meeting of the Southern California Society of Hospital Pharmacists was held at St. Vincent's Hospital in Los Angeles.

A film on Orinase was shown, and this was followed by a discussion on the pharmacological considerations of the drug.

Miss Judy Labson, a pharmacy resident at the Veterans Administration Hospital in Sawtelle, gave a report on a Seminar on Dermatology which had been held recently in San Francisco.

Business transacted at this meeting included a decision to contribute $100 to the local building fund of the California Pharmaceutical Association, and the creation of an honorary membership to be offered to Mr. Walter F. Hitzelburger, retiring chief pharmacist at Los Angeles County General Hospital.

Colorado Society

The regular meeting of the Colorado Society of Hospital Pharmacists was held on February 16 at the University of Colorado Medical Center in Denver.

A report on the plans of the Seminar was given by Mr. Thomas Madden. The Seminar will be held at the University of Colorado Medical Center on April 30, and will be followed by a dinner. Pharmacy students at the University have been invited to the Seminar as guests of the Society.

Dean Waldon of the School of Pharmacy announced plans to offer graduate courses of interest to hospital pharmacists in the near future. The school would like to receive suggestions on the type of subjects that will prove most helpful to hospital pharmacists.

Maryland Association

The March meeting of the Maryland Association of Hospital Pharmacists was held at The Johns Hopkins Hospital in Baltimore.

The guest speaker was Dr. Francis Miller, Associate Professor of Pharmaceutical Chemistry at the University of Maryland School of Pharmacy. Dr. Miller has recently returned from a year's sabbatical leave spent in Heidleburg, Germany. In his talks, he related the differences in the teaching methods of pharmacy and chemistry from those in the United States.

Massachusetts Society

The Massachusetts Society of Hospital Pharmacists met for its regular meeting on March 23 at the Jimmy Fund Auditorium of the Children's Hospital in Boston.

The program for the evening was a panel discussion on "Pharmaceutical Pricing in Hospitals." The source material for the discussion was based on a survey of the member hospitals. This survey is part of the special project undertaken by the Massachusetts Society for 1960 to study pricing policies and schedules in hospitals.

Michigan Society

On March 12, the Michigan Society of Hospital Pharmacists, in cooperation with Pfizer Laboratories, held a Seminar at the McGregor Institute on the Campus of Wayne State University in Detroit.

The one-day program presented the following speakers and topics:

"Hospital Pharmacy's Place in the Profession," by Dr. Don E. Francke, Director of Pharmacy Service at University Hospital, Ann Arbor, and Editor of the AMERICAN JOURNAL OF HOSPITAL PHARMACY.

"Promoting Hospital Pharmacy by Promotion," by Dr. William Blockstein, Assistant Professor of Pharmacy, Wayne State University College of Pharmacy, Detroit.

"Utilizing Statistics in Hospital Pharmacy Management," by Mr. Clifton Latiolais, Director of Pharmacy Services, Ohio State University Health Center, and President-Elect of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS.

"Strip Packaging—A Vital Step to Better Patient Care," by Mr. Robert Bogash, Director of Pharmacy Services, Lenox Hill Hospital, New York City, and Past-President of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS.

"How the Administrator Evaluates His Hospital Pharmacist," by Mr. Owen R. Pinkerman, Director of the William R. Beaumont Hospital, Royal Oak, Michigan.

"The Future Role of the Hospital Pharmacist in Group Medicine"—a panel discussion. The panelists were Mr. Robert Bogash, Mr. Clifton Latiolais, Mr. Owen Pinkerman, and Mr. Edward Superstine, Chief Pharmacist at Metropolitan Hospital, Detroit.

Kansas City Society

Dr. Paul M. Scott of the University of Kansas City School of Pharmacy was the guest speaker at the February 1 meeting of the Society of Hospital Pharmacists of Greater Kansas City.

Dr. Scott gave an informative presentation on the pharmacological basis of the action of psychic energizers. He con-

cluded his talk with the showing of some slides of graphs and charts showing the effects and side effects of the monoamine oxidase inhibitor iproniazid.

New Jersey Society

The New Jersey Society of Hospital Pharmacists met at St. Mary's Hospital in Passaic on February 18.

Dr. Leonard Hines of Roche Laboratories discussed a new tranquilizer, Librium, and a film depicting its pharmacological action was shown.

Mr. Larry Pesa conducted an open forum discussion with the following speakers: Dr. John Voight, Director of Rutgers College of Pharmacy Extension Service; Regina Richards; and Phyllis Mosca. The topics discussed included: "Have We Kept Pace with Salary Levels," "Short-cuts to Faster Dispensing," and "New Concepts in Stock Relocation."

Elections were held during the business meeting, and the following officers were elected to serve for the coming year. *President,* Mrs. Florence Frick: *Vice-President,* Mr. Henry Roche; *Secretary,* Miss Joyce Dolecki; and *Treasurer,* Mr. Victor Ern.

The March 23 meeting of the New Jersey Society of Hospital Pharmacists was a joint meeting with the Northern and Southern New Jersey Branches of the American Pharmaceutical Association. The meeting was held at the Edgebrook Restaurant in New Brunswick, New Jersey.

Mr. Paul Freeman, Manager of Professional Relations for E. R. Squibb and Sons, spoke on "The Pharmacist at Work."

The Society held a business meeting following the joint meeting. At this time a report was given by the Task Committee of the New Jersey Hospital Association, reviewing the objectives and outlining the progress and plans for a controlled study of pharmacy costs in selected hospitals.

A discussion was held on a recent proposal of the New Jersey Board of Nursing to eliminate pharmacology from the curriculum in schools of nursing and integrate it with a course on nursing arts. The members voted to draft a letter to the Board of Nursing, pointing out the possible dangers of such a move and its detriment to the comprehensive practice of nursing.

Northeastern New York Society

The Northeastern New York Society of Hospital Pharmacists met at the Albany Hospital on February 23. Two new members welcomed at this meeting were Mrs. Rose Bronk of Vassar Brothers Hospital in Poughkeepsie, and Mrs. Ann Decker of St. Peters Hospital in Albany.

The discussion at this meeting centered around a notice from the headquarters of the American Pharmaceutical Association concerning the recent article in *Life* magazine on the profession of pharmacy.

The Northeastern New York Society of Hospital Pharmacist met on March 19 at the Ritz Restaurant in Schenectady, New York.

Dr. Rudolph Del Giacco, a practicing physician and Professor of Public Health at Albany College, was the speaker. He spoke on the professional relationships between the pharmacist and the physician. Dr. Del Giacco is a former graduate of the Albany College of Pharmacy.

Ohio Society

The Ohio Society of Hospital Pharmacists held its annual meeting in conjunction with the Ohio Hospital Association on April 4 to 6 at the Deshler Hilton Hotel in Columbus.

CONTINUED ON PAGE 28

IN SURGERY—Generally successful in 60 patients... no infection developed in prophylaxis group... most frank infections responded including some refractory to other drugs. Dosage 600 mg. daily or less. Excellent toleration.[3]

IN CLINIC—Full resolution in 150 soft tissue infections. Transient side effects in two per cent. Dosage 600 or 750 mg. daily for average of six days (alone or with surgical measures).[4]

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ON WARD—Successful in all 32 acute pneumonias but two. Seventeen were complicated by underlying bronchopulmonary problems. Dosage low. No toxicity. Acceptance, toleration excellent.[2]

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REFERENCES: 1. Compilation of Clinical Reports, Department of Clinical Investigation, Lederle Laboratories, January, 1960. 2. Duke, C. J.; Katz, S., and Donohoe, R. F.: Paper read at Seventh Antibiotics Symposium, Washington, D. C., November 5, 1959. 3. Floyd, R. D., and Anlyan, W. G.: Clinical report, cited with permission. 4. Prigot, A.; Maynard, A. de L., and Zach, B.: The Treatment of Soft Tissue Infections with Demethylchlortetracycline. To be published.

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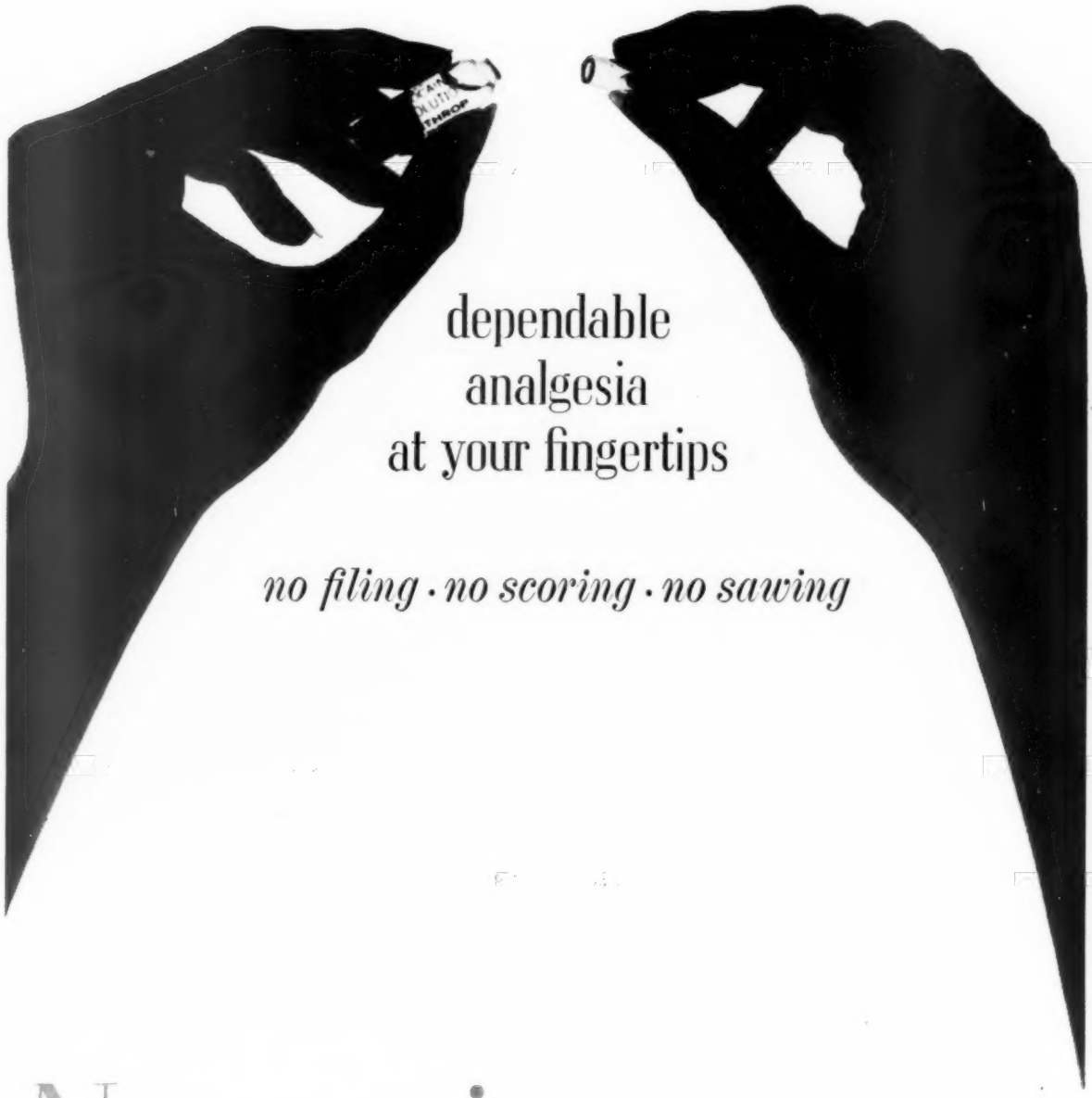

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CONTINUED FROM PAGE 25

The pharmacy section of the meeting included the following speakers and topics:

"Trends in Pharmaceutical Education," by Dr. Rupert Salisbury, Assistant Professor of Pharmacy, Ohio State University, and Director of Internship, Ohio State Board of Pharmacy, Columbus.

"Interprofessional Relations," by Mr. Clifton Latiolais, Director of Pharmacy Services at Ohio State University Health Center, Columbus and President-Elect of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, and Mr. William Woods, Assistant to the Executive Vice-President, National Pharmaceutical Council, New York City.

"Manufacture of Small Volume Parenterals," by Mr. Herbert Flack, Director of Pharmacy Services, Jefferson Medical College, Philadelphia.

In addition to these presentations, the members attended general sessions of the Convention on "Patient Care" and "Personnel Services."

Western Pennsylvania Society

The Western Pennsylvania Society of Hospital Pharmacists held its regular meeting on March 24 at the Western Pennsylvania Hospital in Pittsburgh.

The speaker, Mr. James Vetter, Medical Photographer at the host hospital, discussed the function of the photography department, and listed three areas of contribution to the hospital: (1) better patient care; (2) education; and (3) provide a visual record of the growth and expansion of the hospital organization.

South Carolina Society

The regular quarterly meeting of the South Carolina Society of Hospital Pharmacists was held on February 27 at the Coat of Arms Restaurant in Orvins Court.

The following officers were installed to serve for the coming year: *President* Tom Collier, Greenville General Hospital, Greenville; *Vice-President* William H. Golod, Medical College of South Carolina, Charlotte; *Secretary* Vera Tellis, Medical College of South Carolina; and *Treasurer* William Powers, Jr., South Carolina Baptist Hospital, Columbia.

Wisconsin Society

The members of the Wisconsin Society of Hospital Pharmacists met at the Deaconess Hospital in Milwaukee on February 19.

The speaker for the evening was Dr. James A. Means, Chief of Internal Medicine and Chief of Artificial Kidney at Deaconess Hospital. Dr. Means spoke on the mechanical kidney, discussing the principle of its use, the indications, and a comprehensive description of the mechanics and techniques of its use.

In the business meeting a committee was selected to prepare a manual for the pharmacy operation in small hospitals. Members of the committee are Sister Gladys Robinson, Sister Mary Laurissa, and Mr. Richard Henry. Mr. Max Lemberger, a retail pharmacist of Milwaukee, will serve as an advisor to the committee.

"RESUMPTION OF PERISTALSIS OCCURRED WITHIN 24 TO 48 HOURS IN 89.9% OF PATIENTS RECEIVING **COZYME** . . . NONE SHOWED EVIDENCE OF INTESTINAL ATONY BEYOND 60 HOURS POSTOPERATIVELY."*

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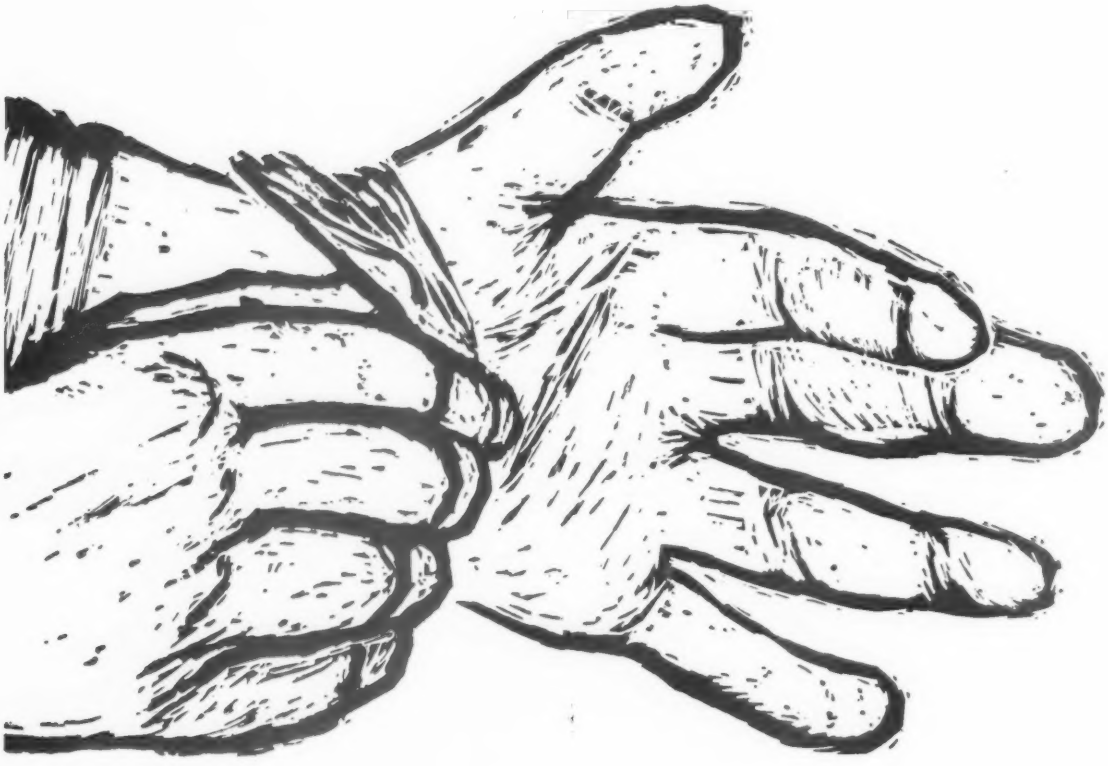
*Lamphier, T.A.: Paper accepted for publication in The American Surgeon.



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The following ASHP members sponsored the New Members listed in this issue of the JOURNAL. *The officers of the* SOCIETY *and the Committee on Membership and Organization appreciate the efforts of the individuals who have encouraged New Members to join the national organizations.*

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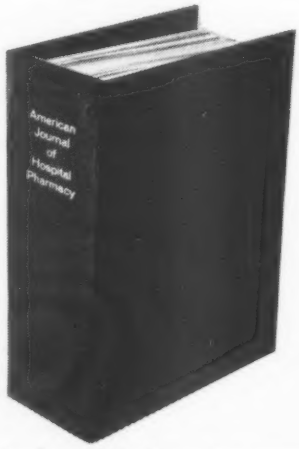
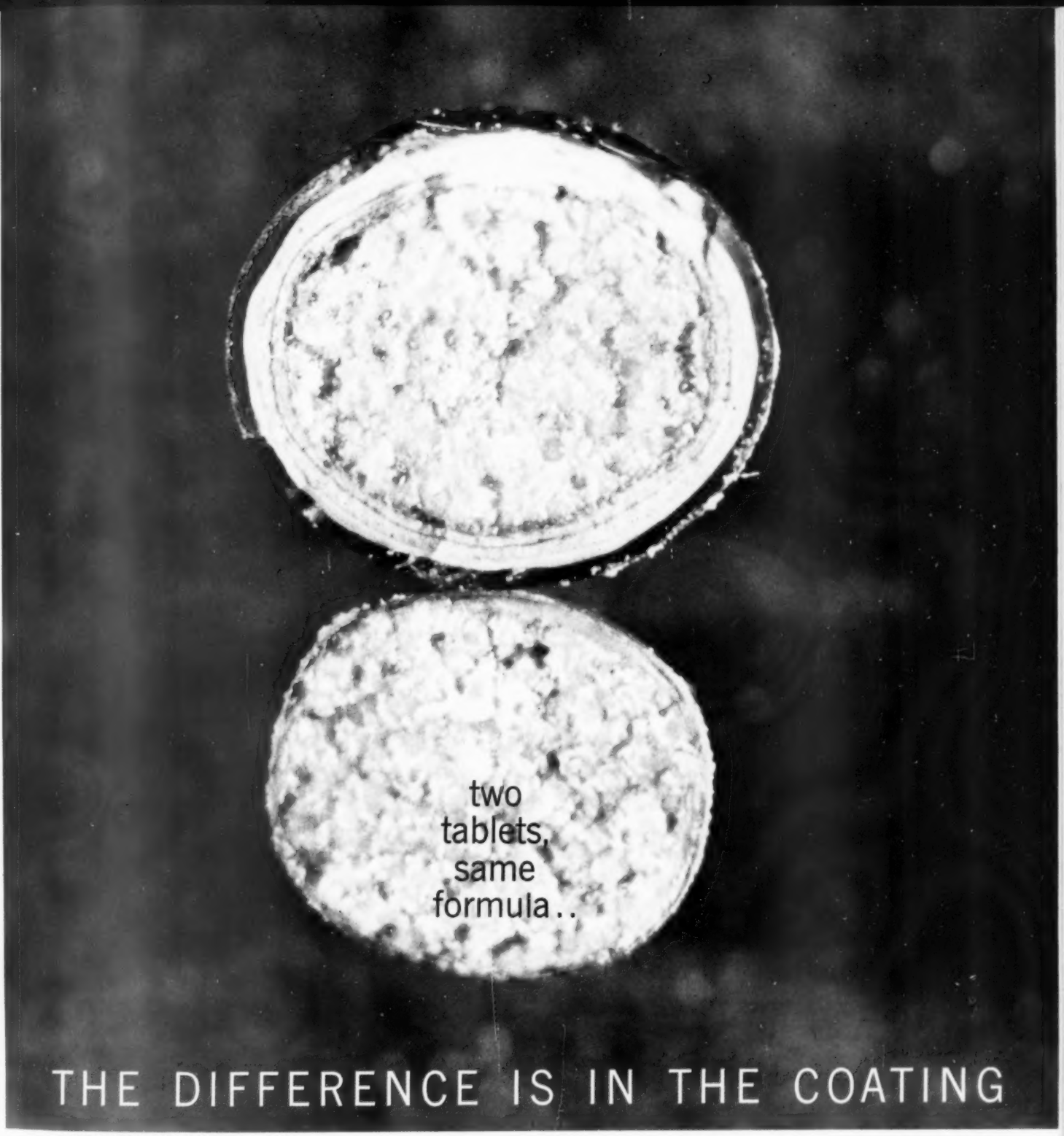


A loose-leaf binder for the AMERICAN JOURNAL OF HOSPITAL PHARMACY is now available from The Hamilton Press, Hamilton, Illinois. The new binder has been designed for THE JOURNAL and will hold the twelve issues satisfactorily. The binder is brown in color and "American Journal of Hospital Pharmacy" is embossed on it in gold. The binder is 9 by 12¼ inches with the spine measuring 4 inches.

The cost of the binder is four dollars ($4.00) each and orders may be directed to The Hamilton Press, Hamilton, Illinois.

A few copies of the loose-leaf binders for THE BULLETIN OF THE AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, which was published on a bi-monthly basis from 1946 through 1957, are available at two dollars ($2.00) each. On ordering binders, please indicate clearly whether you want binders for THE JOURNAL (twelve issues) or THE BULLETIN (six issues).



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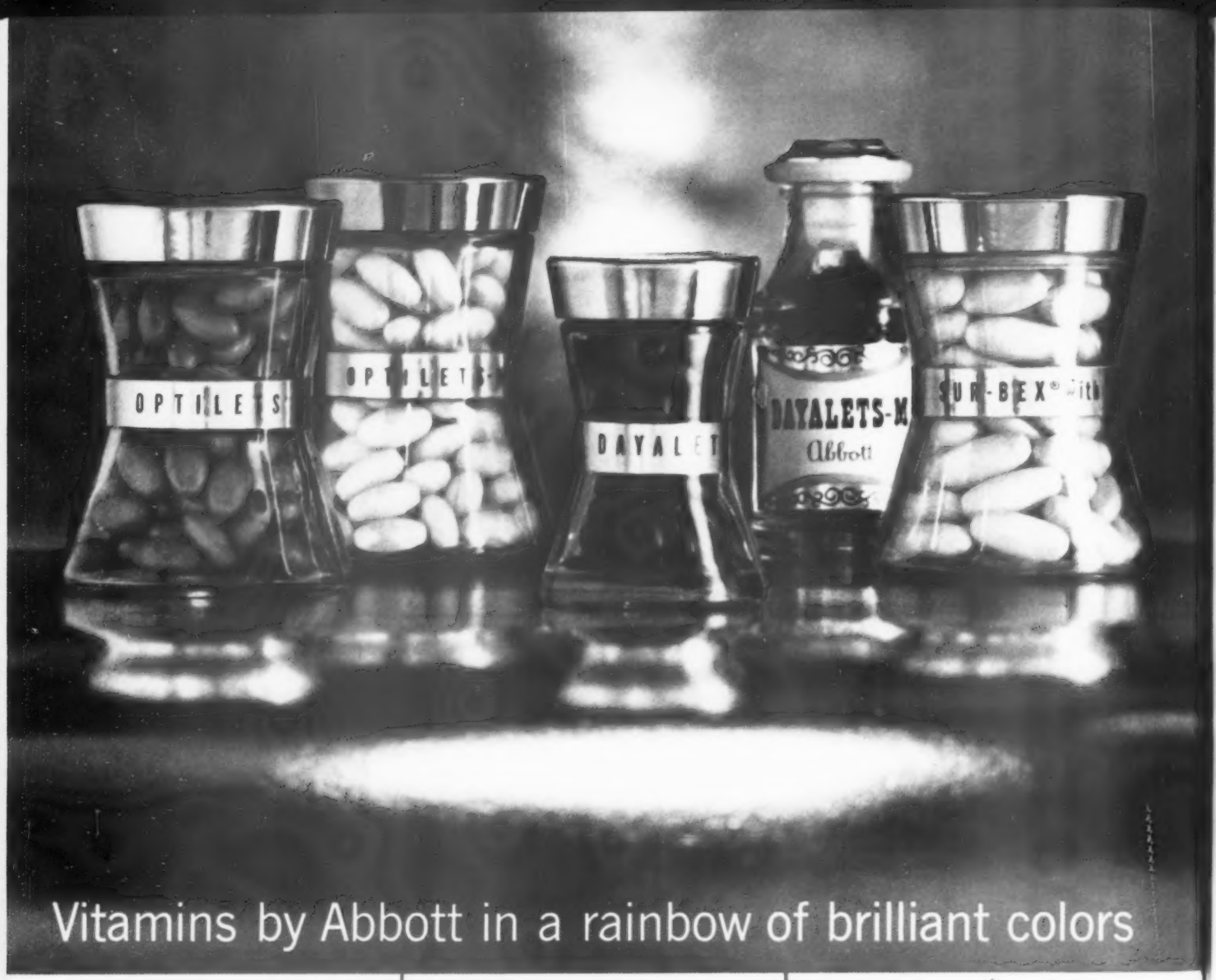

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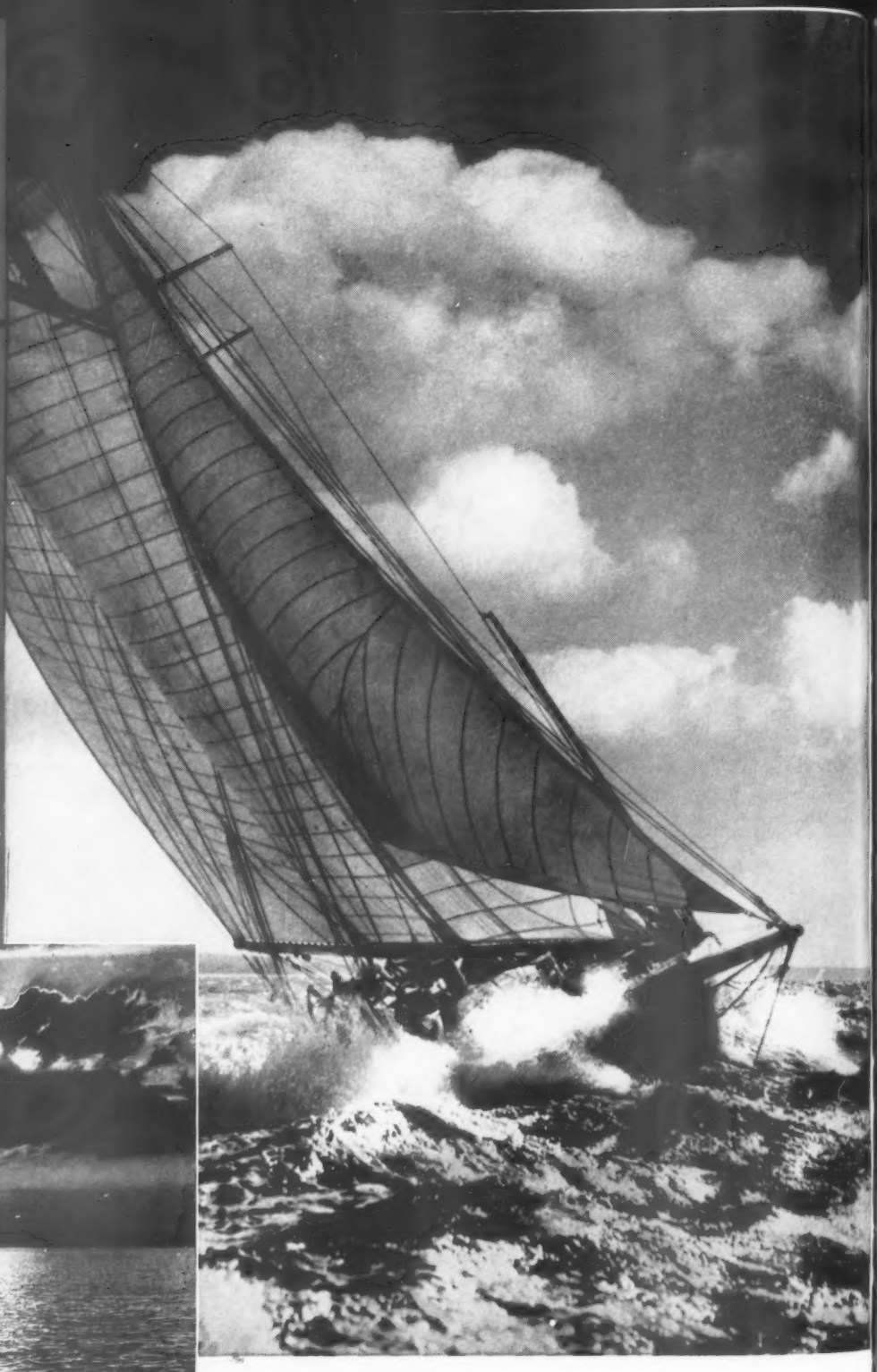

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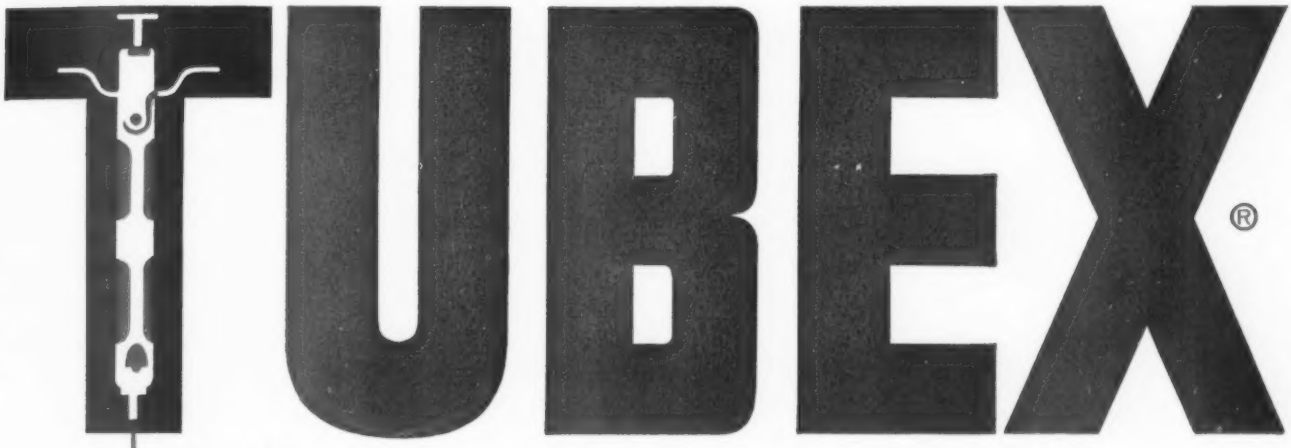

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Puts on 13¼ needed pounds in just 6 weeks;

gains 1" on right biceps;

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Dianabol is a new tissue-building agent with distinct advantages over previous compounds of this type.

By aiding the deposition, synthesis, and utilization of protein, Dianabol affords these benefits in the underweight elderly patients with or without serious disease and in patients who are chronically ill or convalescent:

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Dear Sirs:

Suggestion from Reader

DEAR SIRS: As an Associate Member of the ASHP and practicing pharmacist, I am taking the liberty of making a suggestion regarding the layout of the JOURNAL. I consider the columns entitled " Therapeutic Trends" and "Selected Pharmaceutical Abstracts" of great value and I file them alphabetically. Unfortunately, these columns are printed on both sides of the page and thus make it impossible to file all of it.

May I suggest that these two columns be printed on one side of the page only.

JACOB EISEN, *Science Editor*

New Jersey Journal of Pharmacy
457 Clinton Avenue
Newark 8, New Jersey

Formulary Service Abroad

DEAR SIRS: I have just received the *American Hospital Formulary Service* and wish to thank you very much for sending it to me . . . When working with dosages on an international level, I find this volume a source of most valuable information.

I was myself a pharmacist at the Hospital of Paris from 1920 until 1957 and I can assure you, on a professional level, that the *Formulary Service* is of great value.

RENE HAZARD, *Honorary Professor of Pharmacology*

Faculty of Medicine
Laboratory of Pharmacology and Materia Medica
21 rue de L'Ecole de Medicine
Paris VIe, France

Interest in Article on Supervision

DEAR SIRS: We have had several requests for copies of Mr. Clegg's article entitled "Supervision." It appeared in the March (1960) issue of the AMERICAN JOURNAL OF HOSPITAL PHARMACY. We would appreciate it very much if you could furnish us a supply of reprints.

FERN MICHAEL, *Secretary to Reed L. Clegg*

Veterans Administration Hospital
Salt Lake City 13, Utah

DEAR SIRS: Would you allow us to reprint the article "Supervision" from the March issue of the AMERICAN JOURNAL OF HOSPITAL PHARMACY? We would like to use the article in our *Personnel Information Bulletin.* Credit would be given to the author, who happens to be a Veterans Administration employee, and to your publication. A sample copy of our *Bulletin* is enclosed for your information.

EDWARD R. SILBERMAN, *Assistant Administrator for Personnel*

Veterans Administration
Washington, D. C.

Appreciation

DEAR SIRS: Thanks for the literature, references and suggestions regarding material which can be distributed to pharmacists in Texas who may provide pharmacy service in small hospitals. . .

J. H. ARNETT, *Secretary*

Texas State Board of Pharmacy
Austin 15, Texas

Editorials Discussed by Journal Club

DEAR SIRS: At our Journal Club recently, we had occasion to review your fine editorial on "Investigation on the High Cost of Drugs—A Study in Particularism." We are proud to have these comments from a hospital pharmacists. . .

We also discussed the editorial on "Physicians in Quandaries," and reviewed the candid views of Dr. Harry Beckman in his forward to the 1959-1960 *Year Book of Drug Therapy.* . .

EDWARD SUPERSTINE, *Chief Pharmacist*

Metropolitan Hospital
Detroit, Michigan

Compliments

DEAR SIRS: Your timely editorials in the JOURNAL each month we all enjoy reading. It is not only we who are here now, but those who follow after will appreciate their true value to hospital pharmacy. "Keep up the good work."

SISTER ANNE GALLAGHER, *Pharmacist*

Langlade County Memorial Hospital
Antigo, Wisconsin

DEAR SIRS: You are certainly to be congratulated on the fine job you are doing as Editor of our publication. . .

P. J. HANLEY, *Chief Pharmacist*

Cleveland Metropolitan General Hospital
Cleveland, Ohio

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by DON E. FRANCKE

American Pharmacy in Zagreb

► EXHIBITING THE AMERICAN DRUG STORE at various European fairs and exhibitions appears to be a growing tendency these days. For example, the American Pavilion at the Brussels World's Fair contained an "American Drug Store" about the size of a pullman car. Here the specialty was hot dogs, hamburgers, milk shakes, and Cokes. A few drug sundries completed the "drug store." Poland was treated to a more elaborate type of "Drug Store"—a supermarket with food, hardware, toys, clothing and a whole gamut of "drug store" merchandise. The latest plan, as outlined in *The Evening Star*, Washington, D. C., for April 1, is to have an American drug store as a major part of the United States exhibit at the International Trade Fair at Zagreb, Yugoslavia in September.

American pharmacy in Zagreb will be represented by a counterpart of a Washington, D. C. chain of drug stores. According to *The Evening Star*, ". .. seven merchandising specialists from the Washington chain personally will supervise the arrangement of wares—from drugs to dinnerware—in the Zagreb store."

Such exhibits serve no useful purpose either from the viewpoint of American pharmacy nor that of Continental pharmacy—on the contrary, they are an evil which degrade the profession. They are a source of embarrassment and shame to American pharmacists—at least to that portion of the profession who look with apprehension and disfavor at the growing development of the supermarket-restaurant-liquor store-hardware-grocery store type of American drug store. Unfortunately, the drug stores exhibited at international fairs represent the seamier side of American pharmacy. One would have no objection if they were representative of the better type of American pharmacies. But such pharmacies would not be newsworthy or even noteworthy in Continental countries where essentially all pharmacies reflect a highly professional character and tradition.

European pharmacists and pharmaceutical organizations view these exhibits with unconcealed disgust. For generations they have labored to build pharmacy as a truly professional calling. Educational standards have been maintained at a high level. The pharmacist has been trained in broad aspects of public health so that he may serve the people of his community in a broad range of their health needs, in addition to his role as a prescriptionist. Standards have been developed and enforced which provide minimum requirements for space and equipment which must be included in pharmacies. High ethical standards prevail for professional conduct and practices. The profession is highly organized into associations which provide a means of professional self-government. These efforts and the type of pharmacy resulting therefrom have given the European pharmacist a higher status in society than is enjoyed by his American counterpart. Little wonder, then, that European pharmacists look with disfavor on exhibits of American drug stores in their lands. To the great body of European pharmacists, they represent a threat—an exposure to the view of their citizens of an undesirable type of pharmacy practice. Certainly, such exhibits do not represent a contribution by the profession of one country to that of another. The exhibit in Zagreb will not be more welcome to the pharmacists of Yugoslavia than similar American drug stores have been to the pharmacists of Belgium, France, Germany, Poland, Russia or other countries.

Leaders of American pharmacy, including deans of colleges, may well pause and reflect on the probable results of the trend of transferring the practice of pharmacy from a pharmacy to a supermarket-restaurant-sundry store environment. Is this the type of operation for which our colleges have begun the five and six year educational programs? Is this the future we promise the eager young high school students we seek to attract through our stepped up recruitment programs? Does American pharmacy know what it is doing to itself, to its practitioners, to its future, and to the public's image of pharmacy? What is the responsibility of American pharmaceutical leaders in this situation—should they encourage and condone it by their acceptance, their silence or their inaction?

Some have said that the American drug store should give the public what it wants—that the public demands and welcomes such services. This, we are reminded, was also Al Capone's pretext. It can lead only to the destruction of a noble profession.

RELATIONSHIP BETWEEN BOARDS OF PHARMACY AND HOSPITAL PHARMACIES

by Robert R. Cadmus

► IT IS WITH EXTREME PLEASURE THAT I JOIN YOU to discuss the role of hospital pharmacy as seen through the eyes of the hospital administrator and the physician. Although I speak to you as an individual rather than as a spokesman of any organization I, nevertheless, have been officially involved in the field of hospital pharmacy for sufficient years to at least introduce me to the subject. These experiences have not only given me the opportunity of learning much about many things in pharmacy but have, even more significantly, permitted me to know—as close and respected friends—many wonderful people in all branches of your profession. I commend you for extending your hand of friendship to hospitals and to physicians and for extending to us this opportunity to tell our side of the story. I fully appreciate that this is not your first introduction to such matters. Your past president, Mr. Blanc, in his 1958 presidential address keynoted this subject, and there have been many other prophetic voices down through the years.

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Presented before the annual meeting of the National Association of Boards of Pharmacy, Cincinnati, Ohio, August 17, 1959.

I am glad that you still consider this subject timely and important. Indeed, we have many mutual interests and responsibilities but, realistically, the road ahead has many twists and turns which, perhaps, neither your boards nor hospitals and their medical staffs can yet foresee and should, by some misstep, any of us take separate paths, we may find it difficult to get back together again quickly and effectively. We appear to be in the stage of preventive medicine rather than curative medicine, and I feel comfortable here for this is much more my own specialty.

In preparing my remarks, I cannot ignore that your special interest is the protection of the public health in the field of pharmacy through governmental legislation and control. In turn, I cannot ignore my responsibility for the efficient and economical operation of hospitals aimed at serving the nation's physicians and their patients within the framework of a democratic society. I am sure that, at this session, we will only begin to talk and to learn from each other rather than to make major decisions or prepare joint statements. What I hope we can do today is much as I have been privileged to do for the American Hospital Association with the dentists of this country and which others have done with medical groups and with many other professional organizations. In the field of hospital dentistry, it was appar-

ent that there were problems between hospitals, dentists, physicians, and accrediting agencies. Although a few resolutions had been adopted, nothing had reached the stage of rigidity and consequently we found that we could sit down together, talk objectively, and plan constructively. We have found that we have even been more successful in our negotiations than world diplomats apparently have been in solving their points of tension. During these negotiations, I have said to the dentists many things which they would have preferred I not say but which, I trust, were always accurate. However, we came together, not as a mutual admiration society, but as mature individuals trying in the name of quality patient care, to solve an interprofessional problem and it has been successful.

The Hospital Setting

I look today at this session in much the same way. I feel that we do not know enough about each other's problems to intelligently reach full agreement in one session. Therefore, I would like to confine my remarks to two general areas. The first would be a brief statement of what hospitals are and in what they believe. Then, later, I should like to record a few points which I see to be potential areas of tension which, if we are rational and honest in our motivation, we can discuss openly and negotiate intelligently.

When one talks of hospitals, one refers to a group of institutions numbering slightly less than 7 thousand. They contain over a million and a half beds, admit over 23 million patients per year, record over 86 million outpatient visits, hire about a million and a half people, and spend about five and a half billion dollars each year. Some 81 percent of these hospitals are general hospitals, the remainder being specialty institutions, such as psychiatric and tuberculosis centers. Fifty-two percent are controlled by voluntary Boards of Trustees, some 32 percent by various levels of government, and only some 16 percent by private ownership; and, indeed, even this 16 percent makes up only about 3 percent of the total beds. This, then, is a chain of institutions spread along every highway and byway of this great land of ours in which you and every citizen have a large investment. Perhaps, the sharpening of some of these statistics will begin to open up for us certain of the problems which we face together. Of all of the general hospitals in this country, and it's the 81 percent of general hospitals about which we are most concerned, some 63 percent of these are under 100 beds and only 18 percent are over 200 beds. Therefore, we are dealing, primarily, with small hospitals with big problems. Incidentally, Russell Fiske of the Medical College of Virginia, presented some of these same statistics to you at your 1957 meeting.

Hospital Pharmacy's Self-Evaluation

As far as pharmaceutical statistics are concerned, the Audit of Pharmaceutical Service in Hospitals which is sponsored by the American Pharmaceutical Association and the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS with Don Francke of the University of Michigan as Program Director, offers us our best hope for complete and accurate figures. Incidentally, the American Hospital Association endorsed this study and encouraged its member hospitals to cooperate, either in the site visits or in the questionnaires, so that accurate information could be obtained. Let's admit it; casual questionnaires without such personal attention, often leave much to be desired. Until their final report is published, accurate figures are lacking but it is safe to assume that all but a very small handful of hospitals over 200 beds in size do have, indeed, one or more full-time pharmacists. In hospitals from 100 to 200 beds, about 3 out of 4 have pharmacists—most of them on a full-time basis. As we dip down into the hospitals of less than 100 beds, we find a decreasing number of hospitals with pharmacists either part-time or full-time. The percentage probably runs close to 15 percent. Incidentally, I should like to stress the value which this Audit of Pharmaceutical Service in Hospitals will be, not only to those primarily concerned with hospitals but also to those of you who are concerned with pharmacy in general. The strengths and weaknesses which it is bound to report will be valuable guide lines in determining where and how one concentrates on improving services. This audit, started early in 1956, is the results of the hospital pharmacists own desire to appraise their own effectiveness.. This has not been a governmental commission, created to study a scandal in hospital pharmacy. There has been none. This is not an audit designed to aggrandize the profession or to promote selfish interests. It is a sincere and objective study in the improvement of patient care. It is a part of a long and continuing educational process which should be permitted to flower and to reach its full glory. It should not be combed for deficiencies to be drawn out of context and made the basis of punitive legislative action. If every profession looked at itself as critically, objectively, and conscientiously as the hospital pharmacists have looked at their profession, those individuals who have been created to be the guardians of the public interest, would have little with which to concern themselves.

Hospital Government

But, getting back to hospitals themselves. As we have seen, the bulk of the hospitals in this country are nonprofit in nature. Hospitals have deep ecclesiastical roots. We have our heritage in charity and in service to mankind. People, through their own voluntary

organizations, have provided for their medical care with government filling in only if and where needed, particularly in the catastrophic conditions of tuberculosis, mental disease, contagion, and, of course, the military, where the rights of government are without question. These voluntary hospitals are run by a wide group of sponsoring organizations. A great many are church operated, representing practically all major denominations. Many are run by groups of prominent citizens who have banded themselves together as a Board of Governors or a Board of Trustees to establish and operate a nonprofit hospital. There are hospitals run by civic organizations, by unions, by industry, by universities, and by other groups—all dedicating their service to the welfare of the patient rather than to the accumulation of profits either to the owners or to stockholders. Incidentally, pharmacists being prominent individuals in the communities in which they live, often serve on such Boards of Trustees.

These Boards of Trustees are not mere figureheads with their only purpose being to make handsome financial contributions or to clutter a letterhead with prominent names for the purpose of status and prestige. These trustees are legally responsible individuals who must concern themselves with every aspect of the hospital's operation. This does not merely include the housekeeping services and the building's decor, but it also includes the professional care, the nursing care, the fiscal integrity, and, in fact, everything—big or little—concerning the institution, including pharmacy. The trustees appoint the members of the medical staff and lay down the rules which govern their conduct. They hire an administrator whose job is to carry out the policies which they create. They are trustees, not only in name, but indeed in fact. If there is an error in medication or a laxity in handling drugs, it is they who find their names on the front of the subpoena.

The administrator which they hire is an individual who, with increasing frequency, has had either formal training or adequate experience in hospital operation before he is given the command of his own institution. He is familiar with the activities of each department, including the handling of drugs. It is his responsibility to develop a balanced institution which is efficient and yet economical. He realizes that a patient's life is concerned in many of his decisions. He knows that patients can die from medication errors. He also knows that deaths can occur from mismatched blood transfusions, from falling out of bed or off of stretchers. He knows that an inoperative or malfunctioning oxygen tent, incubator, cautery, or a thousand and one other gadgets can equally do damage and cause death. He knows that an improperly prepared formula or an unrecognized boil on the body of an attendant can cause infections in the newborn with disastrous results. He knows and understands the various professional groups with which he has to work. He knows how these individuals are trained and what standards of performance they hold dear. He recognizes problems of recruitment and problems of job satisfaction. He recognizes the need for financial stability of his institution. He realizes that, in most situations, his hospital cannot be a Rolls-Royce, but rather, it has to be a safe Ford. He serves his community very poorly when he creates an institution of such a nature that the people whom it is dedicated to serve, cannot afford to keep the doors open. A bankrupt hospital or bankrupt Blue Cross Plan—which in turn, pays the hospital—serves no end. The administrator spends his day compromising and balancing between necessities and desires. This is a fine line and one which he has to draw, at times, in the field of pharmacy as well as in many professional and nonprofessional spheres of activity—all of which have a direct bearing on an individual's health and survival.

The administrator is pressed from every side. He is pressed from the economics of the community to keep costs down. He is pressed by the mere scientific and dynamic development in the fields of medicine to constantly increase the scope and quality of his operation. He is pressed by one professional society after another to heed to their minimum standards or their suggested operating policies. He is conscious of the multiplicity of legal requirements which he has to obey. There are licensing laws, minimum wage laws, narcotic laws, property and insurance laws, laws protecting the confidentiality of medical information, withholding tax, social security, sanitary inspections, elevator licensing, and others too numerous to mention.

Standards of Practice

I should like to single out for special attention only two such sets of standards with which the administrator is concerned because they are of particular interest to hospital pharmacists, to you members of Boards of Pharmacy and, of course, to physicians since anything which influences the care of patients, equally concerns the medical profession.

The first is the "Minimum Standard for Pharmacies in Hospitals," copies of which will be available at the close of this session. The idea of creating such minimum standards dates back at least to 1935 but it was not until 1950 that the Policy Committee of the Division of Hospital Pharmacy of the American Society of Hospital Pharmacists and the American Pharmaceutical Association finally hammered out its final draft and presented it to the parent organizations for ultimate approval. These organizations, in addition to the American Society of Hospital Pharmacists itself, were the American Pharmaceutical Association, the American Hospital Association, and the Catholic Hospital Association. The Minimum Standard was approved in rapid order by the constituent groups, and

simultaneously the American Medical Association added its enthusiastic endorsement in the form of an editorial in *The Journal of the American Medical Association*. The Standard covers 6 basic areas: Organization, Policies, Personnel, Facilities, Responsibilities, and Pharmacy and Therapeutics Committee. In general, it embodies every ideal concept and principle in the practice of hospital pharmacy. It is a goal for all to work towards. Undoubtedly, many hospitals have reached it, perhaps a few have surpassed it, but certainly most still fall short in one or more important points. But the path to follow has been laid out and many pilgrims are en route.

Activities of the Joint Commission

The second set of requirements which I should like to mention are those of the Joint Commission on Accreditation of Hospitals. Copies of the Joint Commission's Bulletin No. 16 dealing with pharmacy matters are also available at the close of this session. First of all, a word about the Joint Commission. This is a voluntary group with no legislative power, created in 1951 to continue the long and successful program of hospital accreditation inaugurated in 1918 by the American College of Surgeons. The Commission is a corporate creature of four groups; the American Medical Association, the American Hospital Association, the American College of Surgeons, and the American College of Physicians. The voting power is without question in the hands of doctors of medicine and they have carried this trust well and are still doing an outstanding service in the upgrading and quality control of hospital care. In contrast to the Minimum Standard, which I previously mentioned, and which is an educational goal, this second set of requirements comprises the current yardstick against which hospitals are rated "approved" or "not approved" by the Joint Commission. It is, therefore, natural and proper that these requirements be sufficiently practical and within the possibility of attainment by the majority of conscientious hospitals. Accordingly, a properly supervised drug room is quite acceptable. The way they put it in their explanatory Bulletin is this:

> The hospital which cannot obtain or afford a hospital pharmacist should try and obtain the services of one on a part-time or consultative basis. If the hospital pharmacist of another hospital is not obtainable in this capacity, then the services of a local pharmacist should be utilized wherever possible. With his help, the correct procedures, rules and regulations for this department should be drawn up.

You see, this is relatively permissive. It urges pharmacist supervision but it accepts intelligently planned compromises. It seems to make a real distinction in priority between having "procedures, rules and regulations" drawn up by a pharmacist and having them actually performed by a pharmacist. Of course, other items are mentioned in this Bulletin with which, I am sure, you will heartily agree. In general, a national accrediting agency has a more difficult task than an agency responsible for a single state, regardless of how diversified. They are faced with the real necessity of being both practical and acceptable and, therefore, I think we both can gain from the Joint Commission. They have learned much in the hot fire of experience. Incidentally, you can be reassured that the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS is constantly watching the application of these Joint Commission requirements urging their steady upgrading and each of the three major hospital journals have Pharmacy Sections aimed at constantly upgrading pharmacy practice.

Services of Community Pharmacists

You will recall that these Joint Commission Standards refer to "the services of a local pharmacist." To assist in the definition of this arrangement and to establish guiding principles, the Joint Committee of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS and the American Hospital Association recently prepared and issued a statement entitled: "Suggested Principles of Relationship Between Smaller Hospitals and Part-Time Pharmacists Who Provide Pharmaceutical Services." If a hospital elects this method of pharmaceutical coverage, this document will help both the hospital and the pharmacist to squeeze the maximum out of what is at best a difficult relationship. Copies of this will also be available. I hope you don't think I'm giving you my speech in loose-leaf form, but I think you should have these documents in your files. They will serve as sound foundations upon which to build harmonious relationships between hospitals and Boards of Pharmacy. Also, I would prefer not to spend your time on details adequately recorded in print.

Before I leave this business of part-time pharmacists, however, I want to say that although I urge and sincerely support this concept, I want to warn you that this arrangement does not necessarily come about and evolve successfully merely because a retail pharmacist and a hospital are neighbors in the same community. Therefore, don't jump to the false conclusion that because they are both in close proximity, you can invariably build a statute around this potentiality. There are recorded examples of success and of failure. It takes concessions and understanding on both sides and, sometimes, quite honorable circumstances may interfere with the final sought-for agreement. Further information on this subject can be found in an excellent manual entitled: *Pharmacy Service in Smaller Hospitals* published by Berman and Zugich of the College of Pharmacy at the University of Michigan.

I trust that you will see from these brief remarks and from the reference to these three documents that,

although hospitals are big business in this country, most hospitals are relatively small in size yet complex in organization and management. Each is working desperately in the interest of quality hospital care. Charity, dedication, and service are woven throughout their fabric. Equally a part of their heritage, I am glad to report, is a willingness to learn, to move ahead and to work cooperatively with others.

Relationship Between Boards and Hospitals

I should now like to direct a few remarks to the relationship which must exist between your Boards of Pharmacy and these hospitals. I trust you won't react too violently to the report that many individuals who have tremendous loyalties, both to hospitals and to the profession of pharmacy, are seriously concerned about what may come out of the growing interest your Boards of Pharmacy have in hospitals. We note, for example, in your Board's literature such statements as: "There exists notable differences in the regulations governing hospital and retail pharmacy practice which cannot be reconciled by hospital administration or the jurisdictional agency in any state when the protection of public health is involved." I must confess that my first reaction to that statement is the wonderful French quotation, *Vive la différance*. This statement which seems even a shade stronger than your 1957 resolution, could easily become one of the rallying points about which our two groups could come in conflict. Frankly, it doesn't bother me too much because I have seen many similar statements made by professional groups be resolved with complete unanimity. This has occurred with hospitals and radiologists; with hospitals and dentists; and with other groups with which we deal. But yet, unless statements like this can be faced realistically and objectively by both of us, I am afraid that there will be two competing groups; each battling as the protector of the patient's best interest. We are also concerned about your answers to such questions as: "Are hospitals required to have a pharmacist in charge?" If the NABP Survey is accurate in reporting that 42 states "require that hospitals engage the services of a pharmacist on a full or part-time basis," then, perhaps, the lawyers, the hospital trustees, and the members of state legislators with whom I have talked, are quite right in their admonition that if a statute isn't being, or can't be, enforced, it should be removed from the books. I just don't believe, gentlemen, that today—right now—that *all* of the hospitals in 42 of our states have pharmacists full or part-time. I'll even modify my statement and say that I don't believe that even the 37 percent of hospitals which have over 100 beds in these 42 states, *all* have pharmacists full or part-time. I wish they had. Some day they will. But does the published material accurately report the true situation? I don't know.

Goals and Differences vs Methods and Procedures

It does appear, however, as we both endeavor to protect the public's interest, that we must prepare our own minimum standards of performance. We must distinguish between methods and goals, and between operating procedures and inviolate principles. I give my administrative students this challenge and I tell them that some day one of them may have to lose his job over goals and principles, but that they should never lose them over methods and procedures. It concerns me, then, what definition you have in mind by "different regulations." Are they different in procedure or are they different in principle? With one, I agree; with the other, I disagree. Consequently, we must soon learn to adopt a common glossary of terms.

The dedication of your boards to the public's best interest, of course, is recorded for all to see and to commend. Yet, we are aware of certain times when courts have disagreed with your interpretation of public interests. The sale of aspirin outside of a pharmaceutical channel, is but one example. You might be interested to know that in my own institution, operated by an instrumentality of state government, we have at one end of the building, one of the finest hospital pharmacies in the State of North Carolina. At the other end, we have a wonderful hospitality shop operated by the volunteer women of our Ladies' Auxiliary. At both of these locations, we sell aspirin. But aspirin isn't the point. It is the thinking processes which underlie such actions which concern both hospitals and physicians.

The still undecided issues in Pennsylvania in regard to the Hahnemann Hospital and its chief pharmacist also concern us. We wonder why we, as hospitals, had not been able to develop rapport with that board before such controversial matters reached a head. If this pharmacist is to have his license suspended for 90 days for the same act which had been tolerated for years and which is apparently being tolerated in hundreds of other hospitals in and out of Pennsylvania, where can we gain a sense of trust in your board's desire to work with hospitals in the interest of the public? The formulary system, a sound and respected element of intelligent hospital operation, is a long and complicated story in itself which we can't fully discuss here. But I urge you to study it and get your facts straight. I think you will find the patient's interest is served best under the democratic system whereby the medical staff—through its Pharmacy and Therapeutics Committee—determines its own standards and policies of practice.

Still further, I understand that Michigan's new Rule 35 regarding pharmacists in various sized hospitals was promulgated with, at least in some people's mind, insufficient democratic participation by the people to be affected—hospitals and hospital pharmacists. And,

unfortunately, there are other examples of unilateral action. Please don't misunderstand me, I'm not pointing an accusing finger. I'm not making a judgment. I am saying that we have too much in common to ignore the needs of the other. I don't think we have yet learned the common language which must be learned before we go too much farther down this public interest road together.

We, in hospitals have also, on rare occasions, been involved in legal matters with professional groups—both claiming to uphold the interest of the patient. I suppose our record of success is as mixed as that of the Boards of Pharmacy. In general, however, we have found that we are able to negotiate most of our differences without resorting to court action. I would hope that this same happy possibility could exist in our necessary relationships with Boards of Pharmacy but, at least in Pennsylvania, this is doubtful.

Retail and Hospital Inpatient Practices Not Comparable

Getting back, therefore, to the quotation which I just read, I would hope that as we discuss our problems, we will find that perhaps there is a difference between the retail store and the hospital which will permit different regulations and yet protect the public health. I trust that we do not differ in our goals and in our principles, yet differences in our methods and in our procedures seem justified.

In all honest convictions we cannot accept the comparability of a retail outlet with a hospital pharmacy. Let me hasten to exclude here those aspects of hospital pharmacy concerning the filling of outpatient prescriptions. This, indeed, has a comparability but I doubt if there are any hospitals operating this kind of service without a licensed pharmacist and, therefore, there is no real problem. This is not the time to debate the tangential issue of whether hospitals should or should not be involved in this type of practice, but I trust the Boards of Pharmacy will recognize that their function is to protect the public health in matters of pharmacy and not to evaluate the social, economic, and managerial philosophies under which medical care is rendered in dynamic America.

But getting back to the lack of comparability. It is the "dispensing" activities of the pharmacy of the average community hospital which has primarily triggered the charge of dual standards—that is a standard for retail pharmacy and a standard for hospital pharmacy. Believe me, as a physician I have seen the operation of both drug stores and hospitals and the relationship to the doctor, the relationship to the patient, the relationship to the hospital and its entire organization, and the relationship to the community are radically different between the two. We do not accept the charge of dual standards. We believe there should be a single standard but we also believe that an intelligent democracy provides for appropriate interpretations for varying circumstances. No single mould has yet been found satisfactory for any facet of our society and we don't think it can be found here.

Yet we do not resist regulation in this area. I believe the practical wisdom of the Joint Commission will have much to offer us in preparing safeguards in this activity because, if you recall, I said that they seem to accept a distinction between the laying down of rules and their actual performance. Incidentally, our pharmacist has laid out rules for a drug room in one of our tuberculosis hospitals where the chances of securing even a part-time pharmacist are remote. I think this was a sound first step in upgrading their drug room, and if this had been done because of a regulation rather than through voluntary choice, I would still have been equally pleased. We in North Carolina are trying to resolve these problems cooperatively between the Board of Pharmacy, the Hospital Association, and the Medical Society. Mr. Austin, in the State of Washington, has apparently done it, Virginia has, and so have others. We think this can be accomplished in all states. If you do not know the president or executive secretary of your state hospital association, may I suggest you make his acquaintance. I think you'll enjoy working with him, and he with you. Incidentally, you may be interested in knowing that both the Board of Trustees of the American Hospital Association and the Executive Committee of the ASHP have recently passed resolutions encouraging hospital people to establish friendly relationships with you In turn, you took a similar step a year or so ago. Should you have difficulty in finding the name of the hospital officials in your state, both the A.H.A. and the ASHP maintain listings and you may write them at any time.

Seeking Equitable Solutions

In this process of searching for an equitable solution, I trust that we will all recognize that under our system of jurisprudence, one must commit a crime before one is guilty. Some laws, such as pharmacy and other public health laws, are, of course, regulatory in nature. But before such are usually seriously considered or radically modified, a real threat with documentation of the specific need is required. I would hope that as we go about the necessary business of protecting the public's interest in the area of hospital pharmacy, we protect them from real and not from imaginary or remotely potential evils. Also, we must take care that in protecting them from one group of evils, we do not deny them equally legitimate benefits which they now enjoy.

As you know, the Minimum Standard for Pharmacies in Hospitals calls for supervision by a pharmacist. I have preached these standards since their adoption almost 10 years ago, but I have also preached

the fact that this Minimum Standard represents educational goals and not governmental statutes. I don't advocate the hospital drug room if it can be made into a pharmacy. In turn, I don't advocate that commercial aircraft fly without radar for, as we know, the one single threat to an aircraft in flight is the turbulence of a severe thunder storm. Yet, I flew to this meeting in an aircraft without radar. In the future, I am sure that all commercial aircraft will be equipped with radar and with pressurized cabins too but, let's admit it, even rich and wonderful America, has not reached that point in our evolution and should some law be put into effect tomorrow that all planes must have radar, our air transportation system would be in chaos. I say, in the same analogy, that if some law were to be placed on the books requiring all hospitals to have a pharmacist, that there would be, unfortunately, equal chaos. At the moment, the statistics of passengers lost through aircraft without radar is at a level within the tolerance of public interests, although remedial discussions are going on. I maintain that the same situation exists in many drug rooms in the small hospitals throughout this country. But this does not mean we should not move forward and should not also engage in remedial discussions.

I recognize, of course, that pharmacists can offer hospitals many advantages in addition to protecting the public's safety. There is no question that the quality of drug service goes up, and perhaps, the costs of that service may even go down, when a pharmacist is employed by a hospital, full-time. Our goal is more hospital pharmacists. But of the biggest problems, I suppose, in this radar business as well as in pharmacists, is the problem of supply and demand. I believe that your national figures show that the graduating pharmacists exceed those who drop from the profession by a mere few hundred. This, then, is not time to throw the balance further out of line. Until more of the vacancies we now have in hospital pharmacies are filled, I'm not too enthusiastic in creating more by statutory decree. By education—yes, but by law—no.

Incidentally, this balance problem has been experienced in the hospital field with other professions in the past. For a time, the record librarians, the medical anesthesiologists and, perhaps, even the nurses, in their attempts to upgrade professional standards, have advocated steps which would have adversely affected the supply of these health workers. These suggestions were untenable to hospitals and to the public which they serve. They had to be changed. This, again, does not mean that hospitals are for the *status quo* or are always against progress but, rather, it means that we are for the intelligent evolution of solutions to our problems. We will search diligently and rapidly for ways and means of improving every facet of our operation, only one of which is handling of drugs. I believe this is a record of performance which needs no comment from me because it stands on its own.

Hospital Pharmacists Needed on Boards

May I further repeat the suggestion, as you move into this complex hospital field, that you offer representation on your boards to hospital pharmacists. Such, of course, has already been done in part. Mr. Tom Reamer of Duke Hospital in Durham, North Carolina who, tonight, is to receive the Harvey Whitney Award at the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS' dinner, was once on the North Carolina Board. Mr. Parsons, in his excellent presentation to you 2 years ago, made the same suggestion. I wonder if any boards have been able to move in this direction, although I recognize that appointments obviously rotate slowly and, consequently, there has been inadequate time for a material change. Nationally, however, I would imagine that representation is scanty, and without such representation, in a democracy such as our's, action involving another group wholly unrepresented, leaves the parent body vulnerable on points of principle even before points of issue are raised. Our very country sought its independence on this single point.

Avoid Unilateral Action

I will, therefore, close with but one plea. The public expects that hospitals and Boards of Pharmacy work together. Although I do not speak officially for the Hospital Association, I do know a sufficient percentage of its membership to say that they are reasonable and dedicated people who will work with you and that you, in turn, will find working with them a pleasant and rewarding experience. I would hope that we could both avoid, in the interim, any unilateral legislative action, or even inappropriate resolutions, restrictive definitions, or other devices which represent the "seamy side" of democratic action.

I recognize that a stirring review of the many fine relationships between Boards of Pharmacy and hospitals and a review of your past efforts on behalf of the public and of hospitals, would have been a more acceptable afternoon for you today. However, I think that my very good friend, Dr. Archambault, and the many other pharmacists in the field of education, professional development, and in hospital, retail or manufacturing pharmacy, with whom I have had most pleasant associations, would have felt that I had failed them had I not taken this opportunity to "set the stage" for cooperation and had ignored the possibility of conflict. It has been a great honor to speak before you today and I trust you will forgive my frankness. I will work hard with you in carving a better future. I will always keep the interest of the patient uppermost. And to this end, I hope that my visit here with you has not been in vain.

THE PHARMACOLOGY OF AUTONOMIC DRUGS

by Ralph W. Morris

► OF ALL PHARMACEUTICAL PREPARATIONS NONE ARE more misunderstood than those containing autonomic drugs. Not only are the mechanisms of action misunderstood but, due to the variety of mechanisms and sites of action, much misunderstanding exists as to their therapeutic efficacy. Therefore, the more complete the pharmacist's knowledge is of the autonomic drugs, the more willing will be the health professions to regard the pharmacist as a therapeutic and toxicologic consultant. The problem of keeping "up-to-date" is somewhat more difficult with autonomic drugs than with most other drugs due to the frequency with which new autonomic drugs and formulations are introduced onto the market. However, by proper classification an orderly approach can be made to understanding the mechanisms of therapeutic and toxic actions of autonomic drugs.

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Sympathetic and Parasympathetic Divisions

The autonomic or visceral nervous system is that portion of the nervous system which is under automatic or involuntary regulation in contrast to the

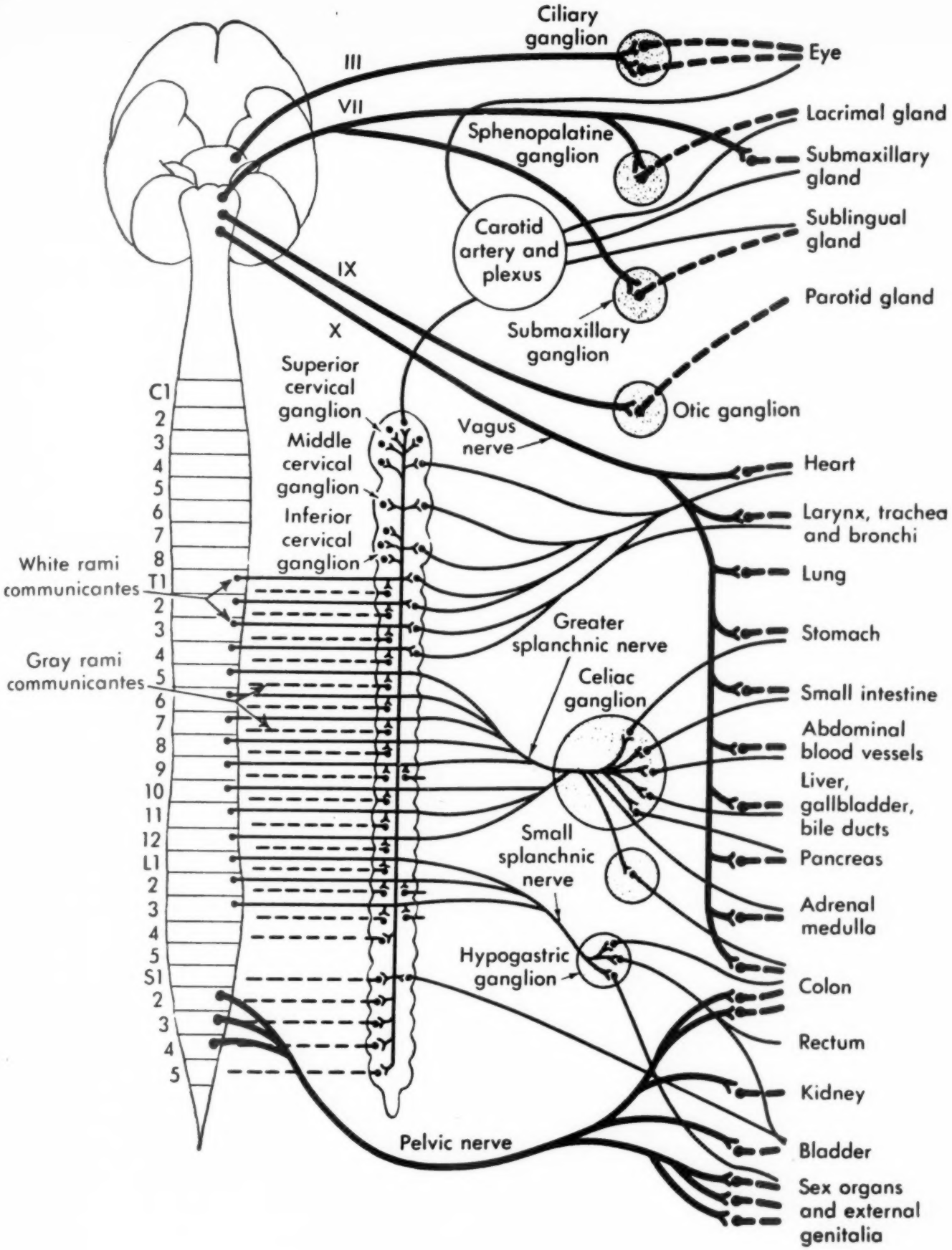

Figure 1. The Anatomy of the Autonomic Nervous System

somatic nervous system which is a volitional nervous system. Another important functional quality of the autonomic nervous system is that it innervates smooth muscle (*e.g.* heart, gastrointestinal tract, blood vessels, etc.) while the somatic nervous system innervates skeletal or striated muscle (*e.g.* diaphragm, biceps, neck, chest, etc.).

The autonomic nervous system (Figure 1) consists of two divisions: the sympathetic with epinephrine and norepinephrine as the neurohumoral agents or chemical mediators and the parasympathetic with acetylcholine as the neurohumoral agent. In most, but not all, instances the response of smooth muscle to stimuli arising from these divisions of the autonomic nervous system are in physiological opposition (Figure 2 and Tables 1-3). These divisions of the autonomic nervous system are integrated or regulated by centers in the hypothalamic region of the central nervous system. The hypothalamus, being but one of many regulatory centers of the central nervous system, is strongly effected by impulses descending from such higher centers of the brain as the thalamus, basal ganglia, and cerebral cortex and by impulses arising from such lower centers as the cerebellum, pons and medulla oblongata. With this network of nerve pathways it is perfectly reasonable and understandable that many autonomic drugs produce some central effects in common with such centrally acting drugs as sedatives, tranquilizers, anesthetics and analgesics. It is also to be expected that some centrally

TABLE 1. RESPONSES OF EFFECTOR ORGANS TO NERVE IMPULSES AND DRUGS

EFFECTOR ORGAN	SYMPATHETIC NERVE IMPULSE	PARASYMPATHETIC NERVE IMPULSE	EPINEPHRINE	ACETYLCHOLINE	ATROPINE
Eye:					
Iris	Dilated	Constricted	Dilated	Constricted	Dilated
Ciliary Muscle	Relaxed (far vision)	Constricted (near vision)	— — — —	Constricted	Relaxed
Heart:					
Rate	Increased	Decreased	Increased	Decreased	None or Decreased?
Stroke volume	Increased	Decreased	Increased	Decreased	Increased
Rhythm	Extrasystoles, Fibrilates	A-V Block, Vagal Arrest	Extrasystole, Fibrilates	A-V Block	Transient A-V Block
Blood vessels:					
Coronary	Dilated	Constricted	Dilated	Constricted	Constricted
Visceral	Constricted	Dilated	Constricted	Dilated	Constricted
Lung: Bronchioles	Relaxed	Constricted	Relaxed	Constricted	Relaxed
Stomach and Intestine:					
Motility & Tone	Decreased	Increased	Decreased	Increased	Decreased
Sphincters	Constricted	Relaxed	Constricted	Relaxed	Variable
Urinary Bladder:					
Detrusor	Relaxed	Constricted	Relaxed	Constricted	Relaxed
Trigone and Sphincters	Constricted	Relaxed	Constricted	Relaxed	— — — —
Ureter: Tone and Motility	Decreased	Increased	Increased	Increased	Increased
Pilomotor Muscles	Constricted	— — — —	Constricted	— — — —	— — — —
Secretions:					
Salivary	Sparse, thick	Profuse, watery	Sparse, thick	Profuse, watery	Decreased
Bronchiolar	— — — —	Increased	— — — —	Increased	Decreased
Stomach and Intestine	Decreased	Increased	— — — —	Increased	Decreased
Sweat	Stimulated	— — — —	— — — —	Increased	Decreased
Blood sugar	Increased	Increased	Increased	Increased	Decreased
Adrenal Medulla*	— — — —	Increased	Decreased	Increased	Decreased
Skeletal, muscle	— — — —	Stimulated	No Effect	Stimulated	No Effect
Body temperature			Increased	Decreased	Increased
Higher centers (Brain)			Excited	Tetany	Excited

*In Reference to epinephrine and norepinephrine output.

acting drugs may produce responses associated with alterations of the autonomic nervous system. There is nearly an unlimited number of bizarre symptoms which might occur from a drug or pathological condition affecting the function of the central or autonomic nervous systems.

The peripheral efferent portion of the autonomic nervous system (*i.e.* the motor fibers external to the spinal cord) is that part of the autonomic nervous system in which are located the sites of action of nearly all our autonomic drugs. The neural pathways of both the parasympathetic and sympathetic divisions of the peripheral efferent autonomic nervous system consist of a myelinated preganglionic fiber, a ganglion, a nonmyelinated postganglionic fiber, and a smooth muscle receptor also commonly called a neuroeffector tissue or organ (Figure 3). A nerve impulse to travel over an efferent fiber must be conducted along the preganglionic fiber, transmitted across the synapse in the ganglion between the preganglionic and postganglionic fibers, conducted along the postganglionic fiber and finally transmitted across the synapse at the neuroeffector site to the effector tissue in which the characteristic response is produced (Figure 3). Each synapse at which transmission occurs involves a neurohumoral agent, either acetylcholine, epinephrine, or norepinephrine depending on the particular site within the autonomic nervous system (Figure 3). It is at these synaptic sites that our autonomic drugs act. Autonomic drugs can therefore be

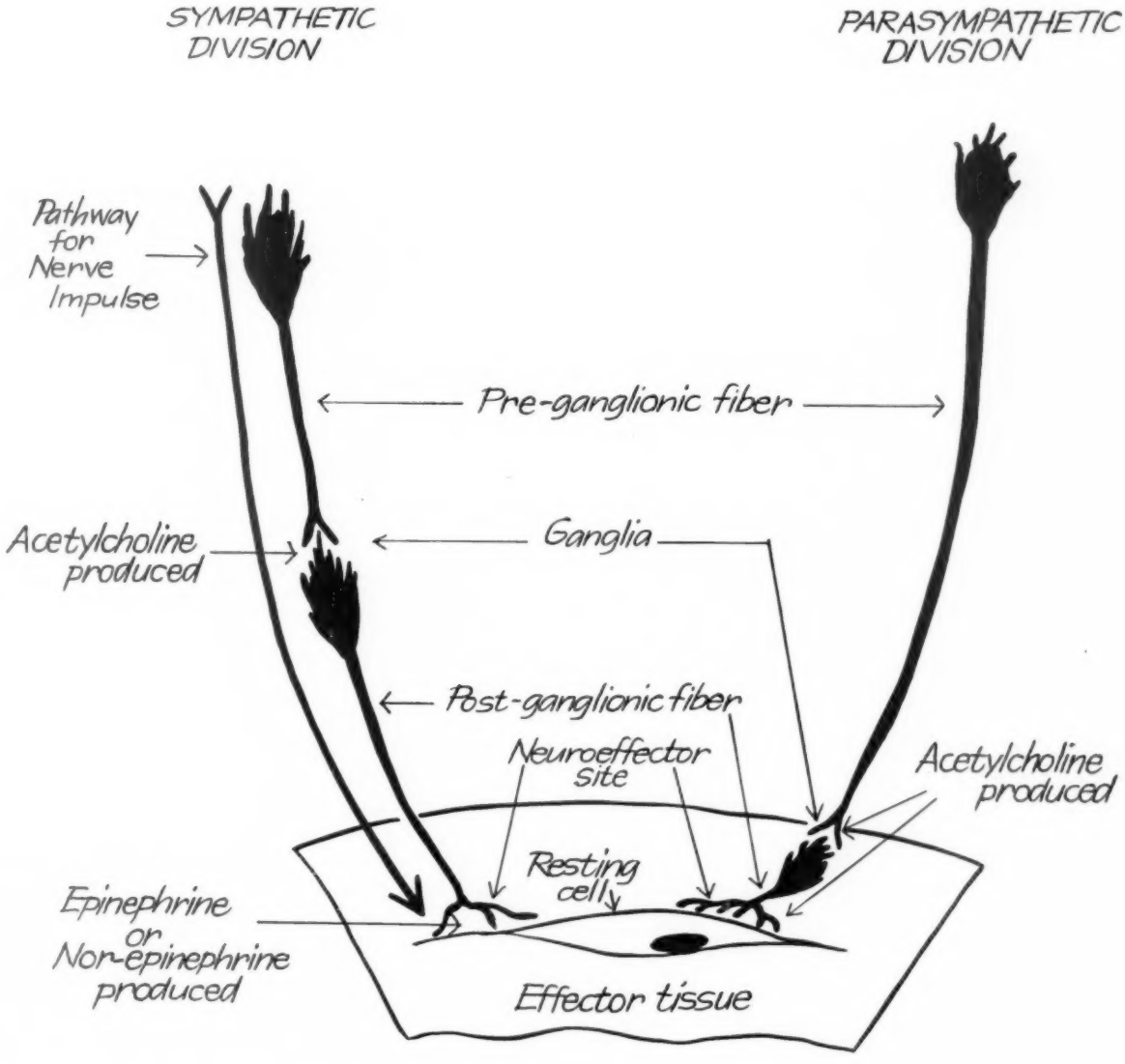

Figure 2. Mechanism of Neurohumoral Transmission in the Autonomic Nervous System

TABLE 2. RESPONSES OF EFFECTOR ORGANS TO DRUGS: SYMPATHETIC BLOCK AGENTS

EFFECTOR ORGAN	PRISCOLINE	DIBENAMINE	BENODAINE	ERGOTAMINE	ERGONOVINE
Eye: Iris	Dilated	Constricted	Dilated		
Heart:					
Rate	Increased	Increased	Increased	Variable Decreased	No Effect
Stroke volume	Increased	— — —	— — —	— — —	— — —
Rhythm	Quinidine-like	Quinidine-like	Quinidine-like	Altered EKG	— — —
Blood vessels:					
Coronary	Dilated	No Effect	Constricted	Constricted	— — —
Skin & Mucosa	Dilated	— — —	Constricted	Constricted	Constricted
Pilomotor muscle	Constricted	— — —	— — —	Paralysis	Constricted
Stomach and Intestine:					
Motility & Tone	Decreased	No Effect	— — —	Increased	— — —
Sphincters	Variable	— — —	— — —	Spasm	— — —
Secretions:					
Salivary	Increased	No Effect (?)	Increased	Increased	— — —
Stomach and Intestine	Increased	— — —	— — —	Increased	— — —
Sweat	Increased	Decreased	— — —	Increased	— — —
Blood sugar	Increased	Decreased	Increase➔Decrease	— — —	— — —
Body temperature	Decreased	Decreased	Decreased	Decreased	Increased
Higher Centers (Brain)	No Effect	Excited	Strong & Variable	Strong & Variable	Strong & Variable
Blood Pressure	Increase➔Decrease	Decreased	Increased	Increased	Slight increase (SpD)
Essential Hypertension	Slight Decrease	Decreased	Increased	— — —	— — —
Pheochromocytoma	Decreased	Decreased	Much Decreased	— — —	— — —
Emetic Center	Stimulated	Stimulated	Depressed	Stimulated	No Effect

TABLE 3. RESPONSES OF EFFECTOR ORGANS TO DRUGS: GANGLIOPLEGIC AGENTS

EFFECTOR ORGAN	NICOTINE (VARYING CONCENTRATIONS)	
	LOW	HIGH (TOXIC)
Eye: Iris	Extremely variable (SpD)	— — — —
Heat:		
Rate	Decreased	Increased
Rhythm	No effect (?)	Auricular alterations
Blood vessels:		
Coronary	Dilated (?)	— — — —
Peripheral	Constricted	— — — —
Lungs:		
Rate	Increased	Decreased
Bronchioles	Constricted	Relaxed
Stomach motility and tone	Decreased	— — — —
Intestinal motility and tone	Increased	Violent increase
Urinary bladder	Constricted	Relaxed
Ureter	Constricted	Relaxed
Secretions:		
Salivary	Profuse	Slight decrease
Sweat	Increased	— — — —
Gastric	?	— — — —
Bronchiolar	Increased	— — — —
Higher centers (Brain)	Convulsions	Depression➔Death
Blood pressure	Increased	Decreased
Emetic center	Stimulated	Depressed
Skeletal Muscle	Curare-like	Curare-like

classed as stimulants or depressants in reference to the particular synapse at which they act (*i.e.* ganglionic, parasympathetic or sympathetic neuroeffector, Table 4).

Increase or Decrease of Normal Functions

A fundamental principle of pharmacology states that no drug can initiate but can only modify (*i.e.* increase or decrease) a normally occurring body function. Consequently all pharmaceutical preparations containing autonomic drugs either increase or decrease the normal function of acetylcholine, epinephrine and/or norepinephrine. In general it is also true that all drugs having the some mechanism and site of action elicit responses which are qualitatively similar though frequently quantitatively dissimilar. Due to such quantitative differences in otherwise qualitatively similar drugs, therapeutic doses of these drugs may produce somewhat different qualitative responses. Drugs which belong to the same pharmacodynamic class may therefore produce slightly different pharmacotherapeutic and/or toxic responses. However, for purposes of brevity, drugs belonging to the same pharmacodynamic class shall be regarded as also possessing identical pharmacotherapeutic and toxic responses. Consequently each pharmacodynamic class can be dis-

cussed on the basis of a single representative drug. Each example has been chosen for its ability to produce a maximum number of pharmacologic responses characteristic of that class and not for its being an ideal therapeutic agent.

Events for Synaptic Transmission

The series of events or action sequence necessary for the synaptic transmission of an impulse is the same whether the neurohormone be acetylcholine, epinephrine, or norepinephrine. There must first be sufficient synthesized neurohumoral agent present at the end of the presynaptic fiber to conduct the impulse across the synapse. Second there must be a specific receptor on the postsynaptic fiber of a configuration quite similar to that of the neurohumoral agent. Third there must be a destructive mechanism by which the neurohumoral agent can be destroyed once its function of transmitting the impulse across the synapse has been completed. For each neurohumoral agent there is a similar action sequence, although the receptors on the postsynaptic fibers and the enzymes responsible for the synthesis and destruction of the agent may be different: acetylcholine is synthesized from acetate and choline by choline acetylase and destroyed by hydrolysis by acetylcholinesterase; epinephrine and norepinephrine metabolism involves a number of enzymes from the multi-enzymatic synthesis from the amino acid tyrosine to the destruction by the enzymes catechol oxidase and monoamine oxidase (Figure 4). Monoamine oxidase (M.A.O.) is much in the news lately since M.A.O. inhibitors (i.e. Iproniazid, Nialamide, Catron, etc.) are in current use as central nervous system stimulants for treating certain psychic depressions.

Action Sequence of Transmittors

The action sequence for each neurohumoral agent contains three areas within which drug induced interference with normal function can occur: synthesis, receptor, and destruction (Figure 4). The drug effect can be either reversible or irreversible: irreversible in that the protein, whether it be an enzyme or a receptor, is permanently altered or destroyed so that normal function will never return and reversible in that the protein is only temporarily altered so that with the passage of time or the use of an antidote the drug effect can be reversed and normal function re-

TABLE 4. PHARMACODYNAMIC CLASSIFICATION OF AUTONOMIC DRUGS

	Autonomic Ganglia	Parasympathetic Neuroeffector	Cholinesterase Inhibitors	Sympathetic Neuroeffector	Monoamine Oxidase Inhibitors
S T I M U L A N T S	Acetylcholine* Neostigmine Pilocarpine Isoflurophate Nicotine-sm. dose* Physostigmine* Tetramethyl Ammonium* Carbachol* Mecholyl* Tensilon Furtrethonium*	Acetylcholine* Mecholyl Neostigmine Pilocarpine Isoflurophate Physostigmine Carbachol Bethanecol Choline* Muscarine* Tensilon Arecoline* Benzypyrinium Furtrethonium Ambenonium	Prostigmin Physostigmine Isoflurophate Tensilon Benzypyrinium Ambenonium Tetraethyl Pyrophosphate Sarin* Soman* Tabun* Parathion* Mipafox*	Epinephrine Norepinephrine Neo-Synephrine Ephedrine Isoproterenol Amphetamine and many synthetic sympathomimetic amines	Iproniazid Nialamide Catron Phenelzine Marplan
			Choline Acetylase Inhibitors		
D E P R E S S A N T S	Hexamethonium Etamon Nicotine-lg. dose* Acetylcholine lg. dose* Ansolysen Inversine Ecolid Trimethaphan Pentamethonium*	Atropine Homatropine Scopolamine Dibutoline Hyoscine Hyoscyamine Eucatropine and numerous synthetic analogues	Botulinis toxin* Pentobarbital* Amytal* Vitamin A* Vitamin K* Vitamin D* Thiamine* Rutin* Morin* Quercetin* Esculetin* d-Catechin* p-Benzoquinone*	Priscoline Benodaine Regitine Phenoxybenzamine Azapetine Ergotamine Ergotoxine Ergonovine* Dihydroergotamine Yohimbine*	No enzymatic alterations have been found to date capable of producing this response. Theoretically, however, anti-metabolites of tyrosine and/or phenylalanine could produce such an effect.

* The drug is used in experimental pharmacology for this effect, but not in therapeutics.

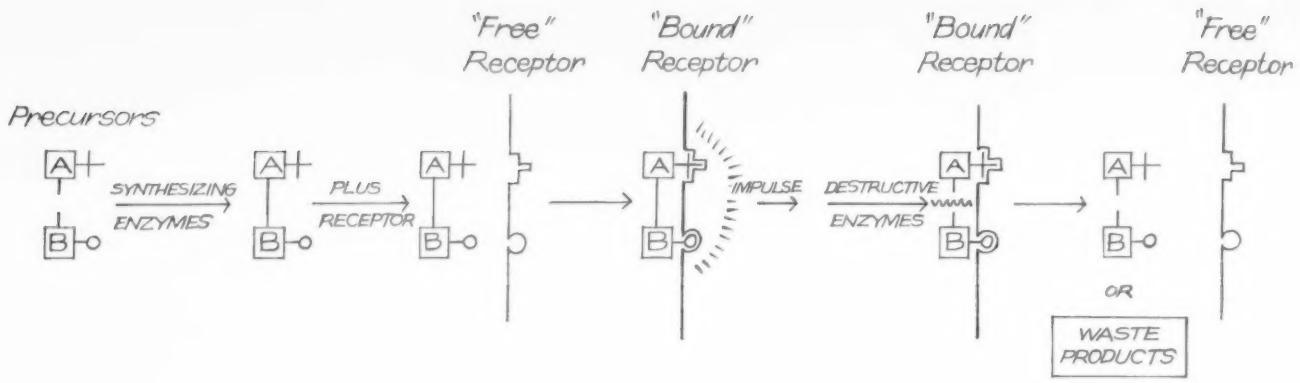

Figure 3. Action Sequence of Neurohumoral Transmittors

turned. Either of these effects can occur regardless whether the drug effect be one of potentiation or inhibition of protein function. The pharmacologic response elicited by a drug depends on the function performed by the effected enzyme or receptor as well as by the nature of the effect. For example, a drug that inhibits acetylcholinesterase (e.g. neostigmine) would decrease the rate of hydrolysis of acetylcholine increasing the concentration of acetylcholine and producing a more pronounced and prolonged acetylcholine response. The pharmacologic response to neostigmine would be one of mimicking the autonomic nervous system wherever acetylcholine was the neurohumoral agent (Table 1). On the other hand, inhibition of choline acetylase (e.g. botulinis toxin) would decrease synthesis of acetylcholine. The resulting deficiency of acetylcholine would produce a pharmacologic response opposite to that of neostigmine, or blockade of the autonomic nervous system wherever acetylcholine was the neurohumoral agent. Enzymatic depression *per se* is therefore not the only important quality of inhibitory drugs. The nature of the enzymatic reaction is also primary to understanding the mechanism of drug action.

Structural Relationships

A reversible reaction of a drug with an enzyme or a receptor usually implies a close structural relationship between the drug and the altered protein. Therefore, continuing to use acetylcholine and the parasympathetic nervous system as examples, it is logical to expect that the proteinaceous metabolic enzymes choline acetylase and cholinesterase and the protein receptor for acetylcholine must have a protein configuration

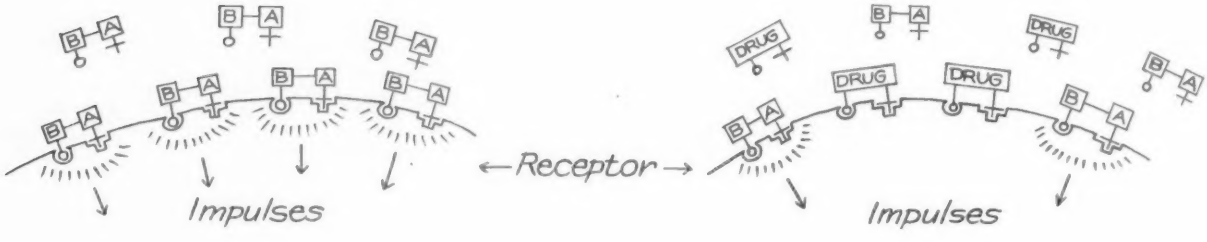

Figure 4. Mechanism of Drug Interference

into which acetylcholine fits quite well (Figure 5). Consequently any drug possessing a configuration similar to that of acetylcholine (e.g. neostigmine, atropine, etc.) can theoretically attach to any protein to which acetylcholine attaches (Figure 5). However, for reasons of membrane permeability, distribution, steriochemistry, etc. most drugs structurally related to acetylcholine exert a more pronounced effect on one acetylcholine site than on others (*e.g.* atropine blocks mainly the parasympathetic neuroeffector site, acting on the ganglia and central nervous system only in much higher or toxic doses).

Very likely the structure activity relationships between acetylcholine, interfering drugs and the associated enzymes and receptors for acetylcholine are paralleled by similar relationships for epinephrine, norepinephrine, interfering drugs and their associated enzymes and receptors. What has been said for acetylcholine can, therefore, also be said for epinephrine and norepinephrine, although the present state of knowledge of epinephrine and norepinephrine receptors and enzymes is meager compared to that of acetylcholine. For example, the enzymes responsible for the synthesis of epinephrine and norepinephrine have never been isolated even in a semi-pure state. Of the two enzymes responsible for the oxidative destruction of epinephrine and norepinephrine, catechol oxidase is an unknown entity that has never been isolated and monoamine oxidase has only very recently been isolated. In many areas of biochemical pharmacology, nearly all efforts to find biochemical mechanisms of drug action have failed. The current status of biochemical pharmacology is best exemplified by the autonomic drugs since more autonomic drug actions can be explained on the basis of a biochemical mechanism than for any other class of drugs.

Human Responses to Drugs

Tables 1-3 list the responses of the human, *in situ*, to therapeutic doses of the drugs selected as class representatives. Acetylcholine, atropine, and epinephrine are all sufficiently characteristic of their classes to be chosen as representatives. For the other classes it has been necessary to list several drugs so as to include prominent variations in drug action within classes. Note that small doses of nicotine exert a stimulant effect on autonomic ganglia whereas in large doses nicotine acts as a ganglionic depressant.

Certain drug effects are not mediated through the autonomic nervous system but result from direct action on the organ or are the result of central nervous system activity: no attempt has been made to compile such drug actions. A series of dotted lines indicate that the autonomic division innervations or drug effects are not known in that organ. The symbol ? indicates that the data is conflicting or taken without adequate controls. The symbol SpD indicates that a marked species variation exists for the drug effects. Unless noted, all actions are those occurring in the human.

Drug Toxicities

Eliminating idiosyncratic and hypersensitivity reactions from consideration, the majority of drug toxicities are the result either of extension of therapeutic responses or the emergence of "new" responses due to the quantitative differences mentioned earlier that exist between otherwise pharmacodynamically similar drugs. A chosen antidote for a particular drug might be either a pharmacologic or physiologic antagonist: pharmacologic antagonist in that the mechanism of antidotal action is by direct competitive antagonism (e.g. Mecholyl toxicity is competitively antagonized by atropine) and physiologic antagonism in that the toxic drug response is antagonized by an opposite physiological response produced by an antidotal drug whose mechanism of action differs from that of the toxic drug (e.g. Mecholyl toxicity is antagonized by epinephrine). Toxicologic references should be consulted for antidotes and the complete medical treatment for a specific drug toxicity.[5-8]

Only the main actions of each class have been included in this short paper. Numerous references are available for those readers desiring greater details on drug actions, dosage, therapeutic applications and toxicities.[9-13]

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the preparation of STERILE AMPULS for use in SPINAL ANESTHESIA

by WALTER M. FRAZIER *and* FRANZ W. GEISZ

► RECENT LITERATURE HAS AGAIN CALLED attention to the hazard of using chemical sterilization for the glass exterior of ampuls containing spinal anesthetics.[1] "Cold sterilization" is not as effective as autoclaving, even though it has been used to sterilize ampuls in a high percentage of hospitals for many years. A residue of bacteriostatic chemical on the surface of the ampul may, by accident, be introduced into the spinal injection and cause irreparable damage to the patient, including arachnoiditis and paraplegia.[2] Furthermore, chemical bacteriostatic agents could penetrate ampuls unnoticed through microscopic cracks in the glass.

Over two years ago at the request of the Anesthesiology Department, the Pharmacy Department of Springfield City Hospital developed a procedure for preparing sterile containers of sterile ampuls. The procedure used at this pharmacy utilizes a combination of sterile technique followed by autoclaving. Briefly the procedure consists of:

1. Bottles, 120 ml. clear flint glass 38 mm. screw neck, are prepared by washing in hot detergent solution.
2. Rinse bottle in hot tap water.
3. Rinse each bottle with dichromate-sulfuric acid glassware cleaner solution.
4. Rinse each bottle with copious quantities of freshly distilled water and drain in stainless steel wire baskets.
5. Liners, 38 mm. red rubber rings for caps, are boiled in 0.5 percent sodium carbonate solution for 10 minutes. Rinse well in freshly distilled water, boil in distilled water, and then re-rinse in freshly distilled water.
6. Caps, new black phenolic 38 mm., are washed in hot detergent solution, rinsed well in freshly distilled water, boiled, and then re-rinsed in freshly distilled water.
7. Ampuls are briefly rinsed in 70 percent isopropyl alcohol and then soaked in at least five changes of freshly distilled water.
8. At this point, all materials have been thoroughly cleaned and rinsed in copious quantities of freshly distilled water and are now handled by aseptic technique.
9. The pharmacist wears a face mask and uses sterile forceps to place the ampuls in the bottles. Rubber liners are placed in the caps with sterile forceps and the caps are screwed loosely on the bottles.
10. The assembled sets are immediately autoclaved at 121° C. for 15 minutes only, followed by immediate slow automatic exhaust.
11. As soon as the bottles have cooled enough to handle, the caps are tightened.
12. Cellulose bands which have been rinsed in several changes of distilled water are then placed on the caps as a seal and dust cover.
13. When the bands are dry, the control number is rubbed stamped on the band.
14. The clinical laboratory checks the sterility of the exterior of the ampul by submerging a sample in bacteriological test media.

Two combination packages of ampuls are prepared in our Pharmacy. They are:

a. Pontocaine 1 percent, 2 ml. ampul with Dextrose 10 percent, 3 ml. ampul.

b. Novocain crystals 100 mg. ampul with Dextrose 10 percent, 3 ml. ampul.

The procedure outlined is simple for any hospital pharmacy which is equipped to prepare injectable products. It provides an important service to the medical staff and may be considered an essential safety measure.

WALTER M. FRAZIER is Chief Pharmacist and FRANZ W. GEISZ is Associate Pharmacist, Springfield City Hospital, Springfield, Ohio.

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Ohio State University Health Center

1960 INSTITUTES ON H

COLUMBUS
June 20-24

Aerial view of Ohio State University

► HOSPITAL PHARMACISTS FROM ALL PARTS OF THE country will have an opportunity to participate in one of three institutes scheduled during the year 1960. Of the three institutes, two will be general institutes and one will be specialized. The two general institutes will be conducted at the Ohio State University, Columbus, Ohio, June 20-24, 1960, and at the University of Minnesota, Minneapolis, Minnesota, August 1-4, 1960. Announcement and registration forms have been sent to all active members of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS as well as to all hospital administrators in member hospitals of the American Hospital Association. Registration for the institute is handled through the American Hospital Association and applications are accepted in the order received. In accordance with the policy for setting up this type of meeting, the number of registrants is necessarily limited.

In each general institute—Columbus and Minneapolis—housing facilities will be available in dormitories at the universities. Special arrangements have been made for members of religious orders. Meals will be served in the university cafeterias and arrangements

Submitted by JOSEPH ODDIS, Staff Representative, Council on Professional Practice, American Hospital Association, Chicago, Ill.

for housing and meals can be made following notification of acceptance to the institute program by the American Hospital Association.

Again, for the fifteenth consecutive year, the American Hospital Association will conduct the institutes in cooperation with the American Pharmaceutical Association and the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. In both cases, the local hospital organizations and the ASHP Affiliated Chapter in each area are assisting and arranging local plans.

Program

Every effort has been made to incorporate the suggestions and ideas presented by Mr. Clifton J. Latiolais, Chairman of the ASHP Committee on Program and Public Relations and his committee members. The program will be based on six general themes—elements of pharmaceutical dispensing, maintaining standards of practice, improving pharmacy administration, drug information center, the hospital formulary system, and professional and organizational activities—around

Centennial Hall, Men's Dormitory, University of Minnesota

August 1-4
MINNEAPOLIS

HOSPITAL PHARMACY

Aerial view of Minneapolis Campus—University of Minnesota Medical Center at left center

Faculties

C—Chicago
M—Minneapolis

MR. RAY AMBERG, Administrator, University Hospitals, University of Minnesota, Minneapolis, (M)

MR. R. DAVID ANDERSON, Director of Pharmacy Services, The King's Daughters' Hospital, Staunton, Va. (C)

MR. PAUL G. BJERKE, Director of Pharmacy Service, Luther Hospital, Eau Claire, Wis. (M)

MR. WINSTON DURANT, Director of Pharmacy Service, University Hospital, University of Wisconsin, Madison. (M)

MR. HERBERT L. FLACK, Director of Pharmacy Service, Jefferson Medical College Hospital, Philadelphia, Pa. (C)

SISTER M. FLORENTINE, Director of Pharmacy Service, Mount Carmel Hospital, Columbus, Ohio. (C)

MR. WALTER FRAZIER, Director of Pharmacy Service, Springfield City Hospital, Springfield, Ohio. (C)

SISTER M. GONZALES, R.S.M., Director of Pharmacy Service, Mercy Hospital, Pittsburgh, Pa. (C)

DR. GEORGE HAGER, Dean, College of Pharmacy, University of Minnesota, Minneapolis. (M)

MR. NORMAN HAMMELMAN, Veterans Administration St. Louis Area, St. Louis, Mo.

MR. RICHARD HENRY, Director of Pharmacy Service, Madison General Hospital, Madison, Wis. (M)

MR. LOUIS P. JEFFREY, Director of Pharmacy Service, Albany Hospital, Albany, N. Y. (C) & (M)

MR. CLIFTON J. LATIOLAIS, Director of Pharmacy Service, University Hospital, The Ohio State University, Columbus. (C) & (M)

MR. RUSSELL F. LOVELL, Director of Pharmacy Service, Akron General Hospital, Akron, Ohio. (C)

MR. JOSEPH A. ODDIS, Staff Representative, Council on Professional Practice, American Hospital Association, Chicago, Illinois. (C) & (M)

MR. PAUL F. PARKER, Director of Pharmacy Service and Central Supply, University of Kentucky Medical Center, Lexington, Ky. (C) & (M)

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MR. NEAL SCHWARTAU, Director of Pharmacy Service, Methodist Hospital, Rochester, Minn. (M)

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MR. PETER SOLYOM, Director of Pharmacy Service, University of Chicago Clinics, Chicago, Ill. (C) & (M)

MR. WILLIAM TESTER, Director of Pharmacy Service, University of Iowa Hospital, Iowa City. (M)

MR. VERNON O. TRYGSTAD, Department of Medicine and Surgery, Veterans Administration, Washington, D. C. (C) & (M)

DR. PETER A. VOLPE, M.D., Administrator, The Ohio State University Health Center, Columbus. (C)

which each day's discussions will be based. Every effort has been made to present a very practical program and, although the 1960 general institutes will follow the same pattern as in the past, the topics under discussion should propose new methods and procedures for those who have been engaged in the practice of hospital pharmacy for some time and offer valuable assistance and aid to the relative newcomer in this field.

The program this year is uniquely arranged with three days of straight lectures and two days devoted to symposia. Monday, Wednesday and Friday, for example, are devoted to a series of lectures presented with the emphasis on specificity resulting in providing the registrants with an intensified body of knowledge. On the other hand, on Tuesday and Thursday, four different symposia will be presented, with each half-day being devoted to a single symposium.The symposia will offer lectures, demonstrations, panel discussions, etc. In each instance, the individual symposium will be a study in depth of the particular subject under discussion for that half-day period. The subjects which will be so treated are: special compounding practices, pharmacy and therapeutics committee, pharmacy information center, and the hospital pharmacist and the formulary system.

Clinic Sessions

Again, this year, a clinic session will be held at the end of each day's program. The student body will be divided into groups of appropriate size, according to the bed capacity of the institution with which the student is associated. Each group will be assigned a group leader who will act as moderator during each session. Each group will be asked to (1) evaluate the day's program, (2) offer suggestions and ideas for improving the program, and (3) discuss the day's program in terms of its application to the operation of the student's pharmacy department. A report of these clinic sessions will be made on the final day of the institute. Faculty members will act as resource advisors and participate in the discussions only as they are invited to do so.

The registrants will be provided an opportunity to quiz the faculty during the session "What's Your Problem?" Selected faculty members will serve as discussants and the registrants will be asked to present specific pharmaceutical problems as they exist in their respective institutions. The discussants will attempt to analyze the problem and offer suggestions for a solution.

"It Worked For Us"

The session "It Worked For Us" is primarily the registrants' private session, with faculty participation

being limited almost entirely to coordination. This session is designed to give the institute registrants an opportunity to discuss briefly a specific problem which they have solved or a gadget which they have put to use. A faculty member will begin on the first day of the institute to interview the registrants who may have something to offer for this session. The institute registrants are encouraged to come prepared to participate in this session. No formal preparation is required. In the past several years, this session has proved to be one of the more valuable and practical sessions of the institute program. It has been demonstrated that the theme of this session—"It Worked For Us"—could be lengthened to include—"It May Work For You."

Planning—Dispensing—Policies

Other important sessions will deal with planning and layout for dispensing efficiency, prepackaging, regulations and procedures for handling narcotics and investigational drugs, control of floor stock drugs, charge systems and pricing policies, the pharmacy budget, utilizing statistics, and others. Complete programs with tentative faculty appointments are included.

Local Committees

Members of the Ohio Society of Hospital Pharmacists and Minnesota Society of Hospital Pharmacists are cooperating in making special arrangements for institute enrollees. Further, representatives from the respective schools of pharmacy in Columbus and Minneapolis are to be commended for their wonderful spirit of cooperation.

At both general institutes, preliminary registration and an informal coffee hour will be featured on the Sunday evening preceding the institute from 4:00 p.m. to 9:00 p.m. Social activities, scheduled for Monday evening, will offer an unusual opportunity for relaxation and entertainment.

Register Early

As mentioned above, applications for participation in the annual institutes are accepted in the order received. Those planning to participate in either of the 1960 general institutes are urged to register as soon as the necessary application forms are received.

The annual Institutes on Hospital Pharmacy have played a vital role in contributing to better pharmacy practice in hospitals. Those who have attended an Institute know their value; those who have not had this opportunity will want to make every effort to participate in one of the 1960 meetings.

Specialized Institute on Hospital Pharmacy

► FOR THE FIRST TIME, a specialized institute on hospital pharmacy will be presented in 1960. Although complete details have not been worked out, preliminary recommendations have been reviewed by the ASHP Executive Committee.

The following general information is being supplied in anticipation of questions. Due to the preliminary nature of the information, the final program is subject to change:

Length—Three days.

Date—October 12-14, 1960.

Location—American Hospital Association Headquarters Building, Chicago, Illinois.

Housing—Lake Tower Motel (four blocks distant).

Proposed Format—Study in depth of one or more subjects:
a) lecture
b) study group
c) seminar (pre-institute readings may be required).

Theme—"Administration" as a central theme with possibly some "professional" subjects.

Program Content—May include: principles of organization and administration, principles of supervision, management planning and scheduling, problem solving techniques, etc.

Requirements—The registrant must be a hospital pharmacist. Further, qualification for attendance at the specialized institute must be determined by each prospective applicant after carefully reviewing the announced program. In arriving at a decision, each individual should consider such factors as, a) attendance at previous general institutes, b) length of experience and previous positions held, and c) current position.

Registration—Processed in order of receipt with proposed limitation of 100.

1960 INSTITUTES - programs

Monday, June 20, Columbus, and August 1, Minneapolis

Theme: Elements Of Pharmaceutical Dispensing
Presiding: VERNON O. TRYGSTAD (C and M)

8:30— 9:00 A.M. Greetings and Orientation
9:00— 9:30 A.M.

9:00— 9:40 A.M. Planning and Layout for Dispensing Efficiency
9:30—10:10 A.M. PAUL F. PARKER (C and M)

A basic consideration in planning a hospital pharmacy is thorough understanding of the objectives and philosophy of the hospital. Essential factors include current and future development, inpatient and outpatient services, hospital physicians' offices, etc. Hospital statistical data which have a bearing on pharmacy department activity must be studied.

With this background information, the pharmacist is better equipped to define scope of service for his department—dispensing, prepackaging, compounding sterile products, storage, information services, etc.

The speaker should take the student through this process. He should also include discussion of factors to be considered in planning a new department or renovating an existing department. Space requirements, work flow, access to utilities (elevators, stairways, etc.) and other services and departments; safety factors and security requirements; considerations such as electrical outlets, floor drains, ventilation, refrigeration, etc. In addition, he should give suggestions, helpful hints and sources of information for pharmacy planning. Visual presentation of a floor plan or development of a floor plan with the student body is advisable.

9:40—10:00 A.M. Extending Dispensing Services to the Nursing
10:10—10:30 A.M. Units
HERBERT FLACK (C)
CLIFTON LATIOLAIS (M)

The speakers will present suggestions for providing improved pharmacy services to the nursing department. With the current critical shortage of nurses and the increased usage of hospital facilities, it is important for the pharmacist to realize that he *must* increase his scope of service to the nursing department. No longer can he be a dispenser of medication only and limit his activities to the confines of his department.

Ways and means of extending dispensing services to the nursing units should be discussed. Such innovations as "drugs-on-wheels," drug replacement systems, newer distribution concepts, etc. should be described.

10:00—10:20 A.M. Break
10:30—10:50 A.M.

10:20—11:10 A.M. Prepackaging for Dispensing Efficiency
10:50—11:40 CLIFTON J. LATIOLAIS (C)
WINSTON DURANT (M)

This session should deal with a discussion of techniques in prepackaging systems; control necessary; factors which determine necessity for prepackaging; who does the prepackaging; items prepackaged (floor stock, clinic preparations, fast movers). What sequence should be followed in this development? What precautions should be taken? What are the advantages? Is such a program practical in a small hospital?

11:10—11:30 A.M. Providing 24-Hour Service
11:40 A.M.—12:00 noon RUSSELL LOVELL (C)
NORMAN HAMMELMAN (M)

A number of methods have been suggested for providing "around-the-clock" pharmacy service—emergency cabinets, extending hours, on-call, intern and resident coverage, etc. These should be discussed in a general way describing the effectiveness of each system. It is important that the pharmacist recognize his responsibility for "around-the-clock" pharmacy service. Too often, pharmacy service after normal pharmacy hours is left to the nursing service. Pharmacy service should not end at 5:00 p.m. or 9:00 p.m. or midnight. If a pharmacist cannot be on duty "around-the-clock," what other alternatives have we?

11:30— 1:30 P.M. Lunch
12:00— 1:30 P.M.

1:30— 2:10 P.M. Regulations and Procedures for Handling Narcotics
PETER SOLYOM (C and M)

Suggested Regulations for Handling Narcotics in Hospitals have been developed and approved by the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, American Hospital Association and Federal Bureau of Narcotics. These should be discussed in a general way. The speaker should also present an overall discussion of narcotic control procedures in hospitals—safety precautions, storage problems, packaging and distribution, inventory control, power of attorney from administrator to sign narcotic blanks, control procedures when receiving narcotic shipments by purchasing department, final disposition of authority when leaving hospital for a new position, etc. Form should be described and distributed, samples of containers and closures should be displayed.

2:10— 2:30 P.M. Floor Stock Drugs—Handling and Control
SISTER M. GONZALES (C)
PAUL BJERKE (M)

The American Hospital Association and AMERICAN SOCIETY OF HOSPITAL PHARMACISTS have recommended: "To urge, through appropriate channels, that hospital pharmacists extend their responsibilities to include participation in programs dealing with the safe handling of drugs throughout the hospital."

This discussion should include methods of controlling drugs on nursing units. The speaker should offer suggestions for enlisting the nurses' cooperation. How are nursing unit inspections conducted? How often? By whom? What is checked? Should report of findings be submitted to director of nursing? What administrative and professional policies should be established?—regarding labeling, storage, transfer of medication, unused medications, narcotics, external drugs, biologicals, etc. Standard forms and checklists should be distributed.

2:30— 2:50 P.M. Handling Investigational Drugs
LOUIS JEFFREY (C and M)

Increasingly, investigational drugs are being used in small general hospitals as well as large teaching institutions. These drugs, because they have not been cleared as being safe for general use, require special attention and unusual control procedures must be developed. On the other hand, care must be taken not to interfere with the investigator's prerogatives. The American Hospital Association and AMERICAN SOCIETY OF HOSPITAL PHARMACISTS have adopted a position in this regard and have developed guiding principles.

The speaker should present basic principles to be considered if a hospital is to use investigational drugs. He should further describe the steps to be followed in setting up control procedures, give details of such procedures, distribute forms, discuss briefly such factors as double-blind tests, code numbers, etc. The speaker should also mention the ethical responsibility of the pharmacist in maintaining confidentiality with respect to investigational drugs of one or more manufacturers.

2:50— 3:00 P.M. Break

3:00— 3:40 P.M. Safety Practices and Procedures in Dispensing
R. DAVID ANDERSON (C)
RICHARD HENRY (M)

The speaker should describe ways and means of insuring the safe handling of medications.

He should suggest procedures for dispensing, labeling, double-checking, transferring medications from container to container, precautions and considerations in assembly—line prescription work, etc. The discussion should include consideration of overall hospital, medical and nursing policies concerning medications—symbols, abbreviations, nursing procedures, etc.

3:40— 4:00 P.M. Clinic Session Assignments

Each afternoon, clinic sessions will be held. The student body will be divided into groups of appropriate size, according to the bed capacity of the institution with which the student is associated. Each group will be assigned a group leader who will act as a moderator during each session. Each group will be charged with three responsibilities: 1) an evaluation of the day's program, 2) suggestions and ideas for improving the program, and 3) discussion of the day's program in terms of its application to the operation of the student's pharmacy department. The moderator must encourage total participation in the discussion. He will serve as recorder and report to the institute coordinator daily after each clinic session. At the end of the week, a clinic session is held on the stage before the entire institute body, in which the discussion leaders and institute coordinators participate. All members of the faculty act as resource advisors and participate in the discussions only as they are invited to do so.

4:00— 5:00 P.M. Clinic Sessions

Tuesday, June 21, Columbus and August 2, Minneapolis

Theme: Maintaining Standards Of Practice
Presiding: LLOYD PARKS (C) GEORGE HAGER (M)

8:30—11:30 A.M. *9:00 A.M.—12:00* Symposium: Special Compounding Practices

The symposium is divided into three parts. Part I is a *lecture* presentation which will apply to and introduce the other two parts. Parts II and III are principally *demonstrations.*

8:30— 9:00 A.M. *9:00— 9:30 A.M.* 1. Meeting Minimum Standards of Practice (Lecture)—

JEANNE SICKAFOOSE (C)
NEAL SCHWARTAU (M)

The Minimum Standard for Pharmacies in Hospitals states that the pharmacy should have facilities for the compounding of medications and the preparation of sterile products. It further states that the pharmacist is responsible for carrying out these functions.

Whether or not bulk compounding and sterile solutions manufactured on a large scale should be performed or whether such large scale operations effect savings are factors which are not important in this discussion. Because of the possibility of requests for formulations and preparations by physicians and other hospital personnel, however, it is essential that the pharmacist and pharmacy department be equipped to meet these specialized requests. In so doing, the spirit of the minimum standard is also accomplished.

The speaker should point out that the Minimum Standard for Pharmacies in Hospitals has been approved by the American Hospital Association, American Pharmaceutical Association, AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, Catholic Hospital Association and editorially by the American Medical Association. In addition, it serves as a basis for pharmacy department evaluation by the Joint Commission on Accreditation of Hospitals. Therefore, every attempt should be made to provide this minimum standard of practice. The speaker could well take the Minimum Standard, discussing each section and offering suggestions for meeting the requirements. This could be accomplished by raising a number of questions. Various check lists are available. He should then give special emphasis to the requirements for *compounding* and *sterile products.* In so doing, the speaker will set the stage for the next two presentations.

9:00—10:00 A.M. *9:30—10:30 A.M.* 2. Special Compounding Service (Demonstration)—

RUSSELL LOVELL (C)
WILLIAM TESTER (M)

The speaker will discuss and demonstrate various types of equipment useful in developing a compounding program. He should be prepared to describe the merits and deficiencies of such equipment, cost of equipment, distribute descriptive literature, etc. The demonstration should be as realistic of actual operating conditions as possible. The speaker should place special emphasis on equipment which can be used to prepare small quantities of special preparations not commercially available.

10:00—10:20 A.M. *10:30—10:50 A.M.* Break

10:20—11:30 A.M. *10:50 A.M.—12:00* 3. Preparing Sterile Products (Demonstration)—

SISTER M. FLORENTINE (C)
WILLIAM TESTER (M)

The speaker will discuss and demonstrate various types of equipment useful in developing a sterile products program. He should be prepared to describe the merits and deficiencies of such equipment, cost of equipment, distribute descriptive literature, etc. The demonstration should be as realistic of actual operating conditions as possible. The speaker should place special emphasis on equipment which can be used to prepare small quantities of special preparations not commercially available.

11:30— 1:30 P.M. *12:00— 1:30 P.M.* Lunch

1:30— 4:00 P.M. Symposium: Pharmacy and Therapeutics Committee

Moderator: JOSEPH A. ODDIS (C and M) *Panel*: LOUIS JEFFREY (C and M) WALTER FRAZIER (C) SISTER M. GONZALES (C) NORMAN HAMMELMAN (M) RICHARD HENRY (M)

The Minimum Standard for Pharmacies in Hospitals considers a pharmacy and therapeutics committee as an essential element of hospital pharmacy service. The Joint Commission on Accreditation of Hospitals strongly recommends that hospitals establish a pharmacy and therapeutics committee as an integral part of the medical staff organization. Because of the numerous medicinal agents available, such a committee has become an absolute necessity as a means of fostering rational therapy and promoting safety of drug usage in the hospital.

The moderator and panelists will discuss the subject in depth. Following the individual presentation, there will be a general discussion period with audience participation.

1:30— 1:45 P.M. 1. Introduction—

The moderator will present historical background. He will give current statistics relative to hospitals reporting pharmacy and therapeutics committees. He will further discuss recommendations concerning the pharmacy and therapeutics committee as contained in the Minimum Standard for Pharmacies in Hospitals, Bulletin No. 16 of the Joint Commission on Accreditation of Hospitals, Statement of the Pharmacy and Therapeutics Committee of the American Hospital Association and AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, pharmacy standards of the state boards of pharmacy and health of the State of Washington, etc. This presentation should serve to introduce the following discussion.

1:45— 2:15 P.M. 2. Pharmacist's Role in Establishing—

The speaker must assume that a pharmacy and therapeutics committee is absent in a hospital recently staffed by a new chief

pharmacist. Such a committee seems desirable. The speaker should outline the steps that should be followed in introducing the idea and receiving acceptance by the administrator and chief of the medical staff, bringing the recommendation to the executive committee of the medical staff, adoption by the staff, inclusion in the bylaws, etc. He should further discuss generally such facets of the committee as the functions, organization, membership, scope, etc. as these relate to establishment of the committee.

2:15— 2:45 P.M. 3. Working with the Committee—

The speaker should discuss such practical aspects as preparation of agenda, preparation of material for meetings, notification of members, minutes, suitable place for the meeting, length of the meeting, suitable time, handling situations as they arise such as the over-talkative member, items which are of proper concern of the committee, etc. The speaker should distribute sample copies of agenda for the first and subsequent meetings.

2:45— 3:00 P.M. Break

3:00— 3:30 P.M. 4. Implementing Decisions—

Recommendations are effective only if they are within the realm of implementation. Once the pharmacy and therapeutics committee arrives at decisions, what steps must be taken to insure their implementation? What segments of the medical, administrative, etc. staffs should receive these? How are they enforced? Who is responsible for continuing adherence? Who is responsible for reprimanding those who do not adhere? How are policy actions publicized?

3:30— 4:00 P.M. 5. Discussion Period

4:00— 5:00 P.M. Clinic Sessions

7:00 P.M.—? What's Your Problem

Presiding: HERBERT FLACK (C) PAUL BJERKE (M) *Panelists:* FACULTY

This will be a question and answer period. Faculty members will serve as discussants. The students will be asked to present specific pharmaceutical *problems* as they exist in their respective institutions. The discussants will attempt to analyze the problem and offer suggestions for a solution.

Wednesday, June 22, Columbus and August 3, Minneapolis

Theme: Improving Pharmacy Administration
Presiding: R. DAVID ANDERSON (C) PAUL BJERKE (M)

8:30— 9:20 A.M. Developing Policies and Procedures
9:00— 9:50 A.M. *Panelists:* PAUL F. PARKER and JOSEPH A. ODDIS (C and M)

This session will include a discussion and illustration of policies and procedures for hospital pharmacy practice.

Writing a procedural manual is a continuing process. Too often, pharmacists look upon this as an ominous task, beyond the realm of accomplishment. This outlook is due, in part, to a lack of understanding of the basic reason for having a procedural manual. It should be stressed that such a manual is developed gradually, a little at a time, as the need arises. Basic advantages for having the manual should be presented. What should be included: How does one start? Samples of policies and procedures should be distributed. Several manuals should be displayed.

9:20— 9:50 A.M. Elements of Good Supervision
9:50—10:20 A.M. PETER A. VOLPE (C)
NORMAN HAMMELMAN (M)

Review of principles of supervision. How is supervision achieved? What relationship is there between supervision and delegation of responsibility? What are some supervisory techniques? How can the administrative staff and personnel department assist the chief pharmacist in improving supervisory techniques and how can they help the pharmacy staff improve job performance through better supervisor-employee relations?

9:50—10:10 A.M. Break
10:20—10:40 A.M.

10:10—10:50 A.M. Developing Charge System and Pricing Policies
10:40—11:20 A.M. LOUIS JEFFREY (C and M)

The speaker should describe various charge systems currently in use. He should distribute copies of forms, etc. Use of an opaque projector to describe details of each form is suggested.

In discussing pricing policies, the speaker should outline steps to be followed. He should describe the common retail policies and relate these to hospital philosophies of charging for services. The relationship and effect of prepayment insurance programs on hospital pricing policies should be described. What effect do the hospital's overall accounting procedure have on charge systems and pricing policies? Effect of hospital's contracts with local county welfare agency aid for the aged etc. programs?

10:50—11:30 A.M. Records? Reports?
11:20 A.M.—12:00 SISTER M. FLORENTINE (C)
WILLIAM TESTER (M)

Types of records and reports which are used in hospital pharmacies should be discussed. This discussion should include those records and reports customarily required by law and others which have been adopted as means of transmitting information to the administrator or other departments of the hospital. Intradepartmental records and reports should also be reviewed. Sample material distribution is encouraged.

11:30— 1:30 P.M. Lunch
12:00— 1:30 P.M.

1:30— 2:00 P.M. Developing Job Specifications and Job Descriptions

VERNON O. TRYGSTAD (C and M)

The need for job specifications and job descriptions should be emphasized. These work for both the employer and employee in identifying the requirements needed to fit a particular position which will involve certain specific responsibilities. These will also serve to delineate responsibility among the employees. Samples should be distributed. The speaker should also outline how to proceed in writing the descriptions—various aids and references.

2:00— 2:40 P.M. Techniques of Purchasing and Inventory Control

HERBERT L. FLACK (C)
WINSTON DURANT (M)

Techniques of "bid buying"; who buys; who interviews the medical representative; the responsibilities of the purchasing agent and the pharmacist; factors that determine amount of purchase; turnover; how often is purchasing done (daily, weekly, monthly); brief description of processing of purchase order; processing of invoices. Relationship of these factors to and techniques of inventory control should be described. Distribution of sample material would be helpful.

2:40— 3:00 P.M. Break

3:00— 3:40 P.M. Preparing the Pharmacy Budget

PETER SOLYOM (C and M)

Hospitals in recent years have become "big business." As with all big business operations, tools of management must be employed. One of these tools is the budget. More and more hospital administrators are employing the budget system as a valuable working tool. Department heads are being asked to prepare and live with realistic departmental budgets.

The hospital pharmacist, as a department head and responsible for a significant portion of the hospital dollar, must be prepared to develop and understanding the budget system, its advantages and limitations.

The speaker should prepare and work out a pharmacy budget with the student body. He should be prepared to illustrate means of arriving at realistic requests and projections for funds. Use of large charts or an opaque projector are suggested.

3:40— 4:00 P.M. Utilizing Statistics in Hospital Pharmacy Management

CLIFTON J. LATIOLAIS (C and M)

Possessing an understanding and a working knowledge of hospital statistics may serve many useful purposes for the hospital pharmacist. The hospital administrator welcomes and desires statistical support for hospital pharmacy requests. Such data serve convincingly in discussions with the administrator and, in turn, assist him in convincing the hospital board of trustees.

The speaker will discuss and illustrate the utilization of statistics. He should give sources for statistics, means of obtaining statistics, suggest which statistical data pharmacists should request, what types of data should be accumulated on departmental activities etc.

4:00— 5:00 P.M. Clinic Sessions

7:00 P.M.—? It Worked For Us

This session is designed to give the institute registrants an opportunity to discuss briefly a situation or problem which they have solved or a gadget which they have put to use. A faculty member will begin on the first day of the institute to interview the registrants who may have something to offer for this session. The theme of this session—It Worked For Us—could be lengthened to include—It May Work For You.

Thursday, June 23, Columbus and August 4, Minneapolis

Theme: The Hospital Pharmacy - Drug Information Center
Presiding: PAUL PARKER (C and M)

8:30—11:30 A.M. *9:00 A.M.—12:00* Symposium: Pharmacy—Information Center

Moderator: PAUL PARKER (C and M)
Panelists: PETER SOLYOM (C and M), HERBERT L. FLACK (C), JEANNE SICKAFOOSE (C), R. DAVID ANDERSON (C), LOUIS JEFFREY (C and M), SISTER M. GONZALES (C), PAUL BJERKE (M), NEAL SCHWARTAU (M), WINSTON DURANT (M), CLIFTON J. LATIOLAIS (M)

The symposium will deal in depth with the central theme of the hospital pharmacy serving as the drug information center. A moderator and a panel will discuss the total concept and six facets of the concept. Each facet should be treated briefly and concisely. Panelists may be asked to present formally one or more of the facets. All of the panelists should be prepared to discuss all aspects of the concept.

8:30— 8:50 A.M. *9:00— 9:20 A.M.* 1. Concept of the Center—

The moderator will introduce the subject with a broad discussion of the concept as a whole. He will point out that the dissemination of drug information is logically the pharmacist's responsibility. How can this be achieved? What facilities are required? What methods can be employed? What type of information should be distributed? What are the resources? etc.

8:50— 9:10 A.M. *9:20— 9:40 A.M.* 2. Planning and Developing the Pharmacy Library—

What is the know-how necessary? How does one convince the administrator of the need for such a service? Texts? Reprint services? Subscription services to continuous revision texts? Newsletter services? Space requirements? Equipment? Location? Features that will encourage usage by medical staff, nursing, etc.

9:10— 9:30 A.M. *9:40—10:00 A.M.* 3. Information Filing Systems—

Where is it? How did I file that? Why can't I ever find anything? These are some of the questions which confront us daily when we attempt to locate something in our files. The speaker will present systems for filing and classifying information and material necessary for pharmacy management. The overall needs for having a systematic classification system for hospital pharmacy material, which is regularly used in the department over and above the reference material on drugs, will be described. Illustrative material should be distributed.

9:30— 9:50 A.M. *10:00—10:20 A.M.* 4. Information Sources—

Practical suggestions of available and reliable sources of information; list of texts which might be found in hospital pharmacy libraries; journals and periodicals with which the pharmacist should be familiar. Other sources readily available such as Division of Hospital Pharmacy, Bacon Library of the American Hospital Association, Library of the American Medical Association, etc.

9:50—10:10 A.M. *10:20—10:40 A.M.* Break

10:10—10:30 A.M. *10:40—11:00 A.M.* 5. Industrial Information Services—

Pharmaceutical industry endeavors in many ways to assist hospital pharmacists in keeping informed and up-to-date. The speaker should ennumerate some of these services. He should describe how these can be useful and what the pharmacist must do to avail himself of such services. The speaker should also outline sources for industrial information services.

10:30—10:50 A.M. *11:00—11:20 A.M.* 6. Pharmacy Bulletin—

The speaker will describe the newsletter, offering suggestions for preparation, content, format, function, etc. Sample newsletters should be distributed.

10:50—11:10 A.M. *11:20—11:40 A.M.* 7. Educational Programs for Professional Staffs—

The speaker should describe the educational programs which can be conducted by hospital pharmacists for professional staffs. What are some of the formal and informal means and techniques which can be employed? What responsibilities does the hospital pharmacist have in these areas? What are the advantages of conducting small programs? Since time is limited, the speaker should prepare definitive material of a specific nature for distribution (selected readings, reprints, course outlines, etc.)

11:10—11:30 A.M. *11:40 A.M.—12:00* 8. Discussion Period—

11:30— 1:30 P.M. *12:00— 1:30 P.M.* Lunch

Theme: The Hospital Formulary System
Presiding: JOSEPH A. ODDIS (C and M)

1:30— 4:00 P.M. Symposium: The Hospital Pharmacist and the Formulary System

Moderator: JOSEPH A. ODDIS (C and M)
Panelists: WALTER M. FRAZIER (C), LOUIS JEFFREY (C and M), SISTER M. GONZALES (C), NORMAN HAMMELMAN (M), RICHARD HENRY (M)

The formulary system has existed for many years. It has been a subject for discussion on numerous institute programs. Because of the importance of the subject, it is again a part of this year's program. It is also one of many considerations of the pharmacy and therapeutics committee discussed earlier in the week.

The moderator and panelists will discuss the subject in depth. Following the individual presentations, there will be a general discussion period with audience participation.

1:30— 1:45 P.M. 1. Introduction to the System—

The moderator will present historical background, quoting statistics to show the number of hospitals reporting formularies, touching on recent occurrences relative to the formulary system, etc. and generally setting the stage for the following discussions.

1:45— 2:15 P.M. 2. Establishing the Concept—

A sound formulary system must have medical staff and hospital acceptance. The speaker should outline clearly the steps that should be taken in establishing the concept. Where does the process begin? What kind of statement should appear in the medical staff bylaws? Should the physician be asked to give written assent other than by signing the bylaws? What part does the pharmacy and therapeutics committee play? Should notations of generic dispensing be made on the doctor's order sheet or prescription? What flexibility should exist? Once a formulary is adopted, how is the doctor kept informed of additions, deletions, etc? What guidelines or authority should the pharmacist be given?

2:15— 2:45 P.M. 3. Operational Problems of the System—

As with all systems, certain operational problems will exist. Similarly, after a hospital has officially adopted a formulary system, problems will arise which must be resolved. Some of these operational problems should be outlined. Possible solutions to the problems should also be outlined.

Labeling? Relating trade and generic names? Standardization of nomenclature? Ordering of drugs by generic names? Physician adherence or non-adherence? Industrial understanding or concern of formulary operational problems? Problems of keeping currently revised? etc.

2:45— 3:00 P.M. Break

3:00— 3:30 P.M. 4. American Hospital Formulary Service—

The Formulary Service has been available for over one year. The speaker should describe use of the Service giving merits and deficiencies of it. He should also compare use of the Service to preparation of individual hospital formularies not based on the Service.

3:30— 4:00 P.M. 5. Discussion Period

4:00— 5:00 P.M. Clinic Sessions

Friday, June 24, Columbus and August 5, Minneapolis

Theme: Professional And Organizational Activities
Presiding: PETER SOLYOM (C and M)

8:30— 9:00 A.M. *9:00— 9:30 A.M.* Establishing Research and Development Activities

HERBERT L. FLACK (C)
NORMAN HAMMELMAN (M)

Too often, hospital pharmacists become complacent in their attitudes, particularly after having achieved success in a projected program. However, changes occur constantly and hospital forces which affect hospital pharmacy practices are constantly in motion. What steps must a hospital pharmacist take to keep abreast and be aware of these forces? What "alerting" and "on-going" programs will prevent complacency? How can pharmacy staff play a part in such a vital role? How can the chief pharmacist reduce to a minimum his own tendency to become complacent? What research and development activities or programs will insure a continuous positive program, in spite of the degree and excellence of past achievement? (The best is never too good!)

9:00— 9:40 A.M. *9:30—10:10 A.M.* So Much For So Little

Panelists: PAUL F. PARKER and JOSEPH A. ODDIS (C and M)

This session will serve to point out that hospital pharmacy is no longer a new entity; that there are established principles, standards, and resources where information is really available. Two speakers will present the topic in a conversational maner employing slides. An attempt should be made to demonstrate the relationship of the Joint Committee of the American Hospital Association and AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, the Joint Commission on Accreditation of Hospitals, the Policy Committee of the Division of Hospital Pharmacy.

The backgound of the development of these groups and their actual relationship to the practice of pharmacy in the individual hospital should be presented.

From this session, the student must be made cognizant of the efforts that have been exerted in the past for the advancement of hospital pharmacy and of the resources presently available and at his immediate disposal. He must recognize the representation which is his at the national level.

9:40—10:00 A.M. *10:10—10:30 A.M.* Break

10:00—10:30 A.M. *10:30—11:00 A.M.* Trends in Hospital Pharmacy

WALTER FRAZIER (C)
CLIFTON J. LATIOLAIS (M)

Just as there are internal hospital forces which have a bearing on hospital pharmacy practices, there are state, federal, educational, licensing, prepayment, social, economic and other forces which may have a similar bearing. Some of these should be discussed in terms of their relationship to hospital pharmacy. Some of these are—hospital physician offices, extension of prepayment plans to include hospital services or ambulatory patients, relationships of hospitals and nursing homes, federal legislation and investigations, state boards of pharmacy, etc.

10:30—10:45 A.M. *11:00—11:15 A.M.* Implementing Institute Information

VERNON O. TRYGSTAD (C and M)

The many suggestions and ideas presented during the institute week will be of little value if no effort is made to apply some of this knowledge. The speaker should suggest ways by which application and implementation might be accomplished.

Over-enthusiasm may also cause problems in having others accept new ideas. How do we "sell" new ideas to the administrator, medical staff, or other department heads?

10:45—11:00 A.M. *11:15—11:30 A.M.* Review Report to Administrator

CLIFTON J. LATIOLAIS (C)
WINSTON DURANT (M)

A brief report prepared by a member of the faculty summarizing the institute proceedings will be read. A copy of this report will be sent to each registrant and his administrator. This should serve as an entree for the registrant in discussing the proceedings with his administrator.

11:00 A.M.—12:00 *11:30—12:15 P.M.* Clinic Session Review

The institute coordinators and clinic session leaders will hold a clinic session before the student body. The purpose of the review session will be to highlight the areas of discussion in the individual daily sessions. Time permitting, an open discussion will follow.

1:00— 3:00 P.M. Luncheon
Presiding: VERNON O. TRYGSTAD (C and M)

The Hospital Pharmacist and the Pharmacy Profession

LLOYD PARKS (C)
GEORGE HAGER (M)

Presentation of Certificates

Therapeutic Trends

edited by WILLIAM JOHNSON

Amino Acid Ointment For Pruritus Ani

A review of 427 cases of antibiotic-induced pruritus ani disclosed that this condition is a common sequel of broad spectrum antibiotics, especially chlortetracycline and oxytetracycline. There seems to be no essential difference between idiopathic pruritus ani and the disease as induced by antibiotics. T. Feinblatt and H. Feinblatt report in *Gastroenterol 38*:247 (Feb.) 1960 that ointments containing benzocaine and related antipruritic drugs may cause serious reactions and increase the irritation. Successful local treatment with both immediate and permanent relief in all 20 cases (100 percent) is reported with use of Hydrolamins amino acid ointment. The period of treatment before this result was obtained, ranged from 2 to 14 days with an average of 6 days. This preparation contains 10 percent lactalbumin hydrolysate, specially prepared to reduce the methionine and cystine content, in a polyethylene glycol base. There were no side reactions, and long continued treatment was not required. The ointment was supplied by Lewal Pharmaceutical Company.

SYLVIA SCHMIDT

Treatment Of Diabetes With Metahexamide

Metahexamide was given to 104 patients in a clinical trial in the treatment of diabetes. Pollen *et al.* reported in *Diabetes 9*:25 (Jan.-Feb.) 1960 the drug, metahexamide was 10 times as potent as tolbutamide in preliminary tests. The drug was given in doses of 200 mg. for the first three to four days, with the maintenance dose being in most cases, 100 mg. daily. Metahexamide, N(3 amino-4 methyl benzenesulfonyl) N-cyclohexylurea, was found to be effective in instances of primary or secondary failure of other arylsulfonamides. The drug permitted a reduction of the insulin requirements in one of the other cases. The side effects to the drug were minimal in degree. The few side effects included malaise, gastrointestinal reaction and transient or sustained alteration of liver function. Five percent of the patients were dropped from the trial because of intolerance. Although the actions of the drug sound promising, heptotoxicity with or without jaundice has been reported in general use and will probably make clinical use of the drug doubtful.

RICHARD H. HARRISON

Primary Glutethimide Addiction

A case report on glutethimide addiction appears in the *N. Y. State J. Med. 60*:280 (Jan. 15) 1960. It is stated that most reported cases of glutethimide addictions have been associated as secondary addictions to other drug or alcohol abuses. In this instance glutethimide was the primary substance in the development of addiction. The drug was used to relieve insomnia, restlessness, anxiety and anorexia of a patient whose elder brother had recently deceased. This drug was used only after several tranquilizers were used to no avail. This patient has a past history of anxiety states prior to the death of his brother. It was at the termination of an extended holiday week-end in February that the patient returned to his doctor for his usual therapeutic session. He was unusually anxious and disturbed, his face had a cyanotic flush, and his pulse was rather rapid and not full. There was a coarse tremor in his upper extremities and his movements in general lacked their usual grace and steadiness. On questioning, he admitted receiving glutethimide without prescription since November. Glutethimide therapy was started with 0.5 Gm. oral dose and within twenty minutes the patient was calmed and felt better. Rapid withdrawal was tried again and similar results were obtained. Slow withdrawal of the drug resulted in a loss of addiction, and the patient's anxiety is now controlled by promazine. The difference between addiction and habituation is also discussed in this article. Glutethimide is manufactured as Doriden by Ciba Pharmaceutical Products, Inc.

DALE R. HYDER

A Benzothiadiazine Diuretic (Be. 724-A)

This analogue in the benzothiadiazine family of potent oral diuretics is evaluated by Ford and Nickell in the *Am. Heart J. 59*:215 (Feb.) 1960 This drug [re-

ferred to as (Be.724-A)] is considered as another advancement in the search for an ideal diuretic which would include, "primarily, a decrease in kaluretic activity and other associated metabolic disturbances, and secondarily, an increase in potency." The structural difference of this drug from dihydroflumethiazide is the addition of a benzyl group to the heterocyclic ring. This evaluation was obtained by studying: (a) the dose response curve; (b) the determination of potency; (c) electrolyte excretion effects; (d) effect on body weight; sodium excretion, and serum biochemical architecture; (e) the therapy in various edematous states; and (f) the effect in antihypertensive therapy. In comparing nine diuretics and using an intramuscular dose of meralluride as an arbitrary standard of 1.0, (Be. 724-A), orally, was evaluated at 1.8 and the others ranging downward to acetazolamide at 0.25, the lowest evaluation. (Be. 724-A) showed a significant increase in naturiuresis and a decrease in loss of potassium and bicarbonate, which classifies it as the nearest agent to the "ideal diuretic." (Be. 724-A) for this study was supplied by E. R. Squibb and Sons.

DALE R. HYDER

Liquid Nitrogen Therapy Of Warts And Other Skin Lesions

Liquid nitrogen, with a temperature of −195.8° C. (as compared with liquid air −191.8° C., liquid oxygen — 182.9° C. and solid carbon dioxide — 78.5° C.) has become readily available for dermatological therapy. Many more lesions can be treated at one sitting than is customarily done by electrosurgery. The cosmetic result is excellent and dressings are not usually necessary. The material is easily applied to irregular surfaces and depth of refrigeration is easily controlled. This report was made by Goodman in the *Can. Med. Assoc. J. 82*:628 (Mar.) 1960.

KENNETH W. HUCKENDUBLER

Oxyphenbutazone In Treatment Of Inflammation And Edema

Oxyphenbutazone, a metabolic product of phenylbutazone, has been found to be an effective agent in the treatment of inflammation and edema. When given orally, it was well absorbed from the gastrointestinal tract and no side effects have been observed. This drug has also been shown to possess an analgesic effect; the relief of pain is believed to be due either to an action on the central nervous system or a reduction of edema at the site of inflammation. Amounts of other drugs necessary to produce relief from pain after various operations was considerably reduced when patients were given oxyphenbutazone. Since this drug is absorbed from the gastrointestinal tract and can thus be administered orally, it possesses a distinct advantage over the proteolytic enzymes used currently in the treatment of infection and edema. This study was reported in *Antibiot. Med. Clin. Therap. 7*:109 (Feb.) 1960, by Miller *et al.*

KENNETH W. HUCKENDUBLER

SKF 6890

The effect of SKF 6890 (a hypertensive agent) after intravenous injection was studied in ten normotensive subjects and ten hypertensive patients. It was found that both groups of patients were responsive, and an effective dose was 2.5 mg. per kilogram. J. Rosenfeld *et al.* in *Clin. Pharmacol. Therap. 1*:39 (Jan.-Feb.) 1960 indicate that the drug blocks levarterenol effects (adrenergic blockade). Bioassay studies revealed that the average effective oral dose was approximately 800 mg. The compound, [2-(2,6-dimethylphenoxy)propyl] trimethyl ammonium chloride hydrate, depressed glomerular filtration rate and renal blood flow when the blood pressure decreased and this was followed by a slight increase of these parameters at the end of the second and third hours. The urinary volume and the sodium and potassium excretion was reduced as the glomerular filtration rate decreased. In long-term experiments, it appeared that patients developed a tolerance to SKF 6890. After six weeks, less than one-fourth of the patients continued to be responsive. The pharmacological observations indicate, however, that this is a new and effective antihypertensive agent which should be used as the basis for synthesizing new compounds of this type. No serious side effects were observed and the main complaints were nausea and dizziness.

SYLVIA SCHMIDT

Chlorthenoxazin—A New Analgesic

Pilot testing of the substance, 2-(β-chlorethyl 1)-2,3-dihydro-4-oxo-(benzo-1-3oxazin), was conducted using mice and dogs as test animals. The pain reflex was determined using chlorthenoxazin in comparison with aspirin. The compound was also shown to possess antipyretic and anti-inflammatory activity. Long-term toxicity studies with dogs showed no harmful effects after six months using a dose of 0.2 Gm./Kg. daily by mouth. In man, small scale double-blind trials were done in patients suffering constant pain from osteoarthritis. Compound codeine tablets and aspirin were used as controls and the pain threshold results did not differ significantly. Chlorthenoxazin does have a period of action up to fifty percent longer than the aspirin or compound codeine tablets with no noticeable side effects. Further trial was carried out with "valtorin" a compound tablet containing 250 mg. of chlorthenoxazin and 200 mg. of phenacetin on 1,000 patients following dental extractions. The analgesic effect of this compound was equivalent to that obtained with compound codeine tablets. Preliminary experience in these trials suggests that chlorthenoxazin is relatively free from gastrointestinal irritant action. Work with the drug is continuing and if present results are confirmed, D. Wilson *et al.* in *Brit. Med. J.* page 36 (Jan.) 1960 believe chlorthenoxazin should prove a most useful addition to the present range of mild analgesics.

SYLVIA SCHMIDT

Timely Drugs

Cyclobar

COMPOSITION: Cyclogyl, methylcellulose, and neomycin citrate.

INDICATIONS: Antibiotic, mydriatic and cycloplegic combination for use in iritis, iridocyclitis, keratitis, choroiditis, and prevention of lenticular adhesions.

SIDE EFFECTS AND CONTRAINDICATIONS: Caution should be exercised in cases where high intra-ocular tension may be present.

DOSAGE: Generally 1 drop at 6 to 8 hour intervals.

PREPARATIONS: Sterile ophthalmic gel containing 1 percent Cyclogyl, methylcellulose, and 0.55 percent neomycin citrate in a neutral gel.

PACKAGING: Tubes containing 3.54 Gm.

SUPPLIER: Schieffelin & Co.

Dianabol

GENERIC NAME: Methandrostenolone.

INDICATIONS: Tissue-building compound indicated whenever weight loss poses a medical problem, especially in underweight elderly patients and in chronically ill and convalescent patients.

SIDE EFFECTS AND CONTRAINDICATIONS: Prolonged administration or higher doses may cause mild androgenicity; other side effects occasionally include nausea and edema; contraindicated in presence of prostatic carcinoma or severe liver damage.

DOSAGE: Average dosage, 5 to 10 mg. daily; when administered over long periods, there should be a 2 to 4-week interval after 6 weeks of treatment.

PREPARATIONS: Tablets containing 5 mg. methandrostenolone.

PACKAGING: Bottles of 100 tablets.

SUPPLIER: Ciba.

Hygroton

GENERIC AND CHEMICAL NAMES: Chlorthalidone; 3-hydroxy-3-(4-chloro-3-sulfamylphenyl) phthalimidine.

INDICATIONS: Antihypertensive and saluretic.

SIDE EFFECTS AND CONTRAINDICATIONS: Occasionally, transient nausea, weakness or dizziness; contraindicated in complete renal shutdown; caution should be exercised in patients with severe renal damage and rising BUN.

DOSAGE: Initially, 50 to 100 mg. daily, given as a single dose in the morning; maintenance dosage must be individually adjusted and may be administered 3 times weekly provided that not more than 200 mg. is given in any single day.

PREPARATIONS: Tablets containing 100 mg. chlorthalidone.

PACKAGING: Bottles of 100 tablets.

SUPPLIER: Geigy Pharmaceuticals.

Motilyn

GENERIC NAME: *d*-Pantothenyl alcohol.

INDICATIONS: For enteric atony and ileus; restores intestinal function in cases of ileus, enteric atony or delayed motility following surgery.

SIDE EFFECTS AND CONTRAINDICATIONS: Should not be started sooner than 12 hours after enterokinetic drugs have been discontinued.

DOSAGE: For prevention of intestinal atony and abdominal distention and for relief of postoperative abdominal distention, 0.5 Gm. parenterally immediately after surgery, repeated in 2 hours and at 12 hour intervals; for relief of paralytic ileus, 0.5 Gm. intramuscularly and repeat at 4 to 6 hour intervals.

PREPARATIONS: Ampuls containing 0.5 Gm. in 2 ml. and vials containing 0.25 Gm. per ml.

PACKAGING: Boxes of 10 and 25 ampuls; boxes of 6 vials.

SUPPLIER: Abbott Laboratories.

Timovan

GENERIC AND CHEMICAL NAMES: Prothipendyl hydrochloride; [4-dimethyl-aminopropyl-pyrido (3,2*b*) (1,4) benzothiazine] hydrochloridemonohydrate.

INDICATIONS: In relief of tension in ambulatory patient and to treat neurogenic component aggravating symptoms of other disorders such as acne, allergies, hypertension, etc.

SIDE EFFECTS AND CONTRAINDICATIONS: Should not be used in cases of acute alcoholism or barbiturate poisoning.

DOSAGE: Depending on age of patient and severity of symptoms, 100 to 400 mg. daily in divided doses has been found effective.

PREPARATIONS: Tablets containing 25 mg. or 50 mg. prothipendyl hydrochloride.

PACKAGING: Bottles of 100 and 1,000 tablets.

SUPPLIER: Ayerst Laboratories.

Twiston and Twiston R-A

GENERIC AND CHEMICAL NAMES: Rotoxamine; the active isomer of racemic carbinoxamine.

INDICATIONS: Antihistaminic especially useful in symptomatic treatment of seasonal or perennial allergic rhinitis and other allergic disorders.

DOSAGE: Adults, 2 to 4 mg. three or four times daily; children over 6, 2 mg; children 3 to 6, 1 to 2 mg; and under 3, 1 mg. Twiston R-A, adults, one tablet every 8 to 12 hours.

PREPARATIONS: Tablets containing 2 mg. rotoxamine; Repeat Action tablets containing 2 mg. in outer coating and 2 mg. in inner coating for delayed action.

PACKAGING: Twiston, bottles of 100 and 1,000 tablets; Twiston R-A, bottles of 50 and 500 tablets.

SUPPLIER: McNeil Laboratories, Inc.

Velacycline

GENERIC NAME: N-(Pyrrolidinomethyl) tetracycline.

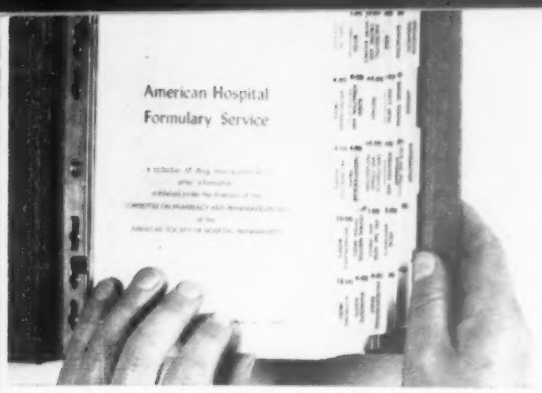
INDICATIONS: Effective against infections due to tetracycline-susceptible organisms.

SIDE EFFECTS AND CONTRAINDICATIONS: As with any broad-spectrum antibiotic, patient should be observed for signs of secondary infection caused by non-susceptible organisms.

DOSAGE: Intramusculary, 0.35 Gm. twice daily or 0.15 Gm. three times daily; intravenous, 0.35 to 0.7 Gm. every 12 hours.

PREPARATIONS: Intramuscular, vials containing 0.15 or 0.35 Gm. N-(pyrrolidinomethyl) tetracycline, 40 mg. lidocaine and 0.3 Gm. ascorbic acid; intravenous, vials containing 0.7 Gm. N-(pyrroldinomethyl) tetracycline and 0.3 Gm. ascorbic acid.

SUPPLIER: Squibb.



AMERICAN HOSPITAL FORMULARY SERVICE

edited by WILLIAM HELLER, *Chairman ASHP Committee on Pharmacy and Pharmaceuticals*

Fifth AHFS Supplement

► THE FIFTH SUPPLEMENT to the *American Hospital Formulary Service*, which was distributed in April, contained monographs on the following drugs:

amphotericin B (Fungizone) 8:12
demethylchlortetracycline (Declomycin) hydrochloride 8:12
The Antimalarials (general statement) 8:20
hydroxychloroquine (Plaquenil) sulfate 8:20
primaquine phosphate 8:20
pyrimethamine (Daraprim) 8:20
pyrimethamine (Daraprim) 8:40
pyridostigmine (Mestinon) bromide 12:04
syrosingopine (Singoserp) (including Singoserp-Esidrix) 24:08
phenazocine (Prinadol) 28:08
trimethobenzamide (Tigan) hydrochloride 56:20

Sixth AHFS Supplement

► THE SIXTH SUPPLEMENT to the *American Hospital Formulary Service*, which is planned for distribution in June, is expected to contain monographs on the following drugs:

pyrvinium (Povan) pamoate 8:08
procyclidine (Kemadrin) hydrochloride 12:08
carisoprodol (Rela, Soma) 12:20
styramate (Sinaxar) 12:20
anisindione (Miradon) 20:12.04
alphaprodine (Nisentil) hydrochloride 28:08
ethoheptazine (Zactane) citrate (including Zactirin) 28:08
oxymorphone (Numorphan) hydrochloride 28:08
methsuximide (Celontin) 28:12
benactyzine (Phobex, Suavitil) hydrochloride (including Deprol) 28:16
ectylurea (Levanil, Nostyn) 28:24
neomycin sulfate 52:04.04
nandrolone phenpropionate (Durabolin) 68:08

Receipt of Supplements by Subscribers

► WE HAVE HAD considerable difficulty with a number of hospitals in addressing the supplements. We have made as many as three mailings of the same supplement to a hospital before the person responsible for the upkeep of the formularies received that supplement. We would strongly urge that the name of the person or department responsible for marking and distribution of the supplements be a part of the address. If the subscription is for one individual only, his name should be a part of the address.

In sending changes of address to the printer, The Hamilton Press, Hamilton, Illinois, please give the *address currently being used* by the printer as well as the new address.

Before reporting to the printer that supplements have not been received, we suggest that you check with other departments in your hospital which may have received the mailing and set it aside, not knowing what to do with it.

Of course, renewal notices for subscriptions to the supplements for 1960 have been sent to the same address used for mailing the supplements. If you have not received your renewal notice, you may renew by letter to The Hamilton Press. The cost of the supplements for the year 1960 is $5.00 per subscription for 1-9 subscriptions, $4.75 per subscription for 10-24 subscriptions, and $4.50 per subscription for 25 or more subscriptions.

AHFS to Use ACS Nomenclature

► BEGINNING WITH THE FIFTH SUPPLEMENT to the American Formulary Service, which was distributed in April, only chemical names approved by the American Chemical Society will be used in drug monographs. The editors of *Chemical Abstracts* have agreed to review our proposed material and to assign drugs the proper chemical names in accordance with their terminology.

We hope such a program will help to standardize the chemical names of drugs, even though other chemical names may be used in the literature and in advertising. Standardization of chemical names is important to pharmacists as it facilitates recognition of compatible and incompatible structural groups of drugs compounded in the pharmacy or added to intravenous fluids by physicians and nurses.

Nonproprietary Names Approved by Council on Drugs

Similarly, in cooperation with the Council on Drugs of the American Medical Association, nonproprietary ("generic") names of drugs included in the Formulary Service will be consistent with those developed by the Council. Only in rare instances, perhaps, will a monograph be issued before the nonproprietary name is established.

CONTROL OF POISONINGS

edited by **ALBERT L. PICCHIONI,** *Director, Arizona Poisoning Control Program*

Moth Ball Poisoning in Children

► DESPITE THE ODOR AND SIZE OF MOTH BALLS, children, especially under the age of 5, appear to be attracted to them. Parents should be warned to keep these tempting, shiny, white objects out of reach of their children.

The most common constituent of moth balls is naphthalene. The toxicity of this chemical agent is not generally appreciated. It has only been in the recent past that case histories in this country have been reported revealing the potential danger of naphthalene moth balls. In fact, as late as 1948 certain standard textbooks on pediatrics stated that, since naphthalene in moth balls is not soluble, it passes through the digestive tract without absorption and is harmless. Since 1949, several reports in the literature describe toxic symptoms resulting from the ingestion of naphthalene moth balls. Although naphthalene is insoluble in water, absorption from the gastrointestinal tract does occur; apparently, the high vapor pressure of this compound facilitates absorption.[1] The toxic dose is not known, but as little as one naphthalene moth ball (0.5 Gm.) has produced toxic symptoms. In some cases, children have tolerated larger amounts without ill effects; however, this is probably related to varying degrees of absorption.[1,2]

Acute hemolytic anemia is the most serious effect that may follow ingestion of naphthalene moth balls. Naphthalene itself is not hemolytic, either when injected directly into the blood stream or when added to a suspension of erythrocytes. There is evidence to suggest that the toxic metabolites of naphthalene, primarily alpha naphthol, are responsible for the hemolytic effects.[3,4] When acute intravascular hemolysis occurs, it usually begins within three to five days after ingestion and is accompanied by anemia, pallor, leucocytosis, tachypnea, hemoglobinuria, and jaundice. The urine is dark or port wine in color, and, as a rule, free of red blood cells. Renal tubular blockade and acute renal failure may follow the acute hemolytic crisis. Heinz bodies in the red blood cells are found before the hemolytic process becomes evident and are, therefore, of prognostic value in determining in which patients hemolysis may develop.[1]

Other symptoms associated with acute naphthalene intoxication from ingestion of moth balls include abdominal cramps with nausea, vomiting, and diarrhea. These symptoms appear in one to two days following ingestion.

Another potential danger from naphthalene moth balls should be noted. A number of cases involving infants have been reported in which acute hemolytic anemia accompanied naphthalene intoxication as a result of absorption of this compound from diapers which had been stored in naphthalene moth balls. The oil employed on the skin of the babies was believed to facilitate absorption of the naphthalene.[4,5]

Treatment of acute poisoning from naphthalene is primarily supportive. Replacement of the hemolyzed blood by whole blood or packed red blood cells is of primary importance. Corticosteroids and corticotropin appear to have been beneficial in a few cases of naphthalene hemolysis.[1,6] To allay gastrointestinal distress, demulcents such as milk, egg white, and gelatin are useful, but oils should be avoided, because they may promote absorption of the naphthalene.[6]

In the event that a child swallows a moth ball, the preferred method for removal is induced emesis, since moth balls are too large to pass through a gastric lavage tube. (*In vitro* studies[7], employing a modified U.S.P. XV Tablet Disintegration Test[8] in the presence of simulated gastric fluid or simulated intestinal fluid for periods as long as 24 hours, resulted in little disintegration of naphthalene or paradichlorobenzene moth balls. However, on the basis of differences in the weight of the moth balls before and after the tests, it was noted that a small proportion of each moth ball dissolved in the simulated digestive fluids.) Following emesis, a saline cathartic such as sodium sulfate in water should be administered.[6]

Paradichlorobenzene is also used in moth balls; however, it is considered to be less toxic than naphthalene. Irritation of the eyes and nose follow inhalation of high concentrations of this compound, but no acute human toxicity has resulted from ingestion of paradichlorobenzene.[9]

References

1. Haggerty, R.J.: Naphthalene Poisoning, *New Eng. J. Med. 255*:919, 1956.
2. Zuelzer, W.W. and Apt, L.: Acute Hemolytic Anemia Due to Naphthalene Poisoning: Clinical and Experimental Study, *J.A.M.A. 141*:185, 1949.

3. Mackell, J.W., Rieders, F., Brieger, H., and Bauer, E.L.: Acute Hemolytic Anemia due to the Ingestion of Naphthalene Moth Balls, *Pediatrics* 7:722, 1951.
4. Cock, T.C.: Acute Hemolytic Anemia in the Neonatal Period, *A.M.A. J. Dis. Children 94*:77, 1957.
5. Schafer, W.B.: Acute Hemolytic Anemia Related to Naphthalene, *Pediatrics* 7:172, 1951.
6. Gleason, M., Gosselin, R., and Hodge, H.: *Clinical Toxicology of Commercial Products,* The Williams & Wilkins Co., Baltimore, 1957, p. 161.
7. These studies were carried out in the College of Pharmacy, The University of Arizona, Tucson.
8. *The United States Pharmacopeia,* 15th rev., Mack Publishing Co., Easton, Pa., 1955, p. 936.
9. Hollingsworth, R.L., Rowe, V.K., Oyen, F., Hoyle, H.R., and Spencer, H.C.: Toxicity of Paradichlorobenzene: Determinations on Experimental Animals and Human Subjects, *Arch. Indust. Health, 14*:138, 1956.

Edathamil Disodium Available for Medicinal Use

► ANOTHER PREPARATION OF ETHYLENEDIAMINE tetraacetic acid (EDTA) or edathamil has been made commercially available for medicinal use as an antidote. It is the disodium salt of edathamil named Endrate Disodium by the manufacturer, Abbott Laboratories. It possesses the same properties of forming water-soluble, non-ionized complexes or "chelates" with certain metallic ions as does edathamil calcium disodium, which has been used with considerable success for several years in the treatment of acute and chronic lead poisoning.

The edathamil disodium preparation is available in 20 ml. ampuls containing 150 mg. edathamil disodium per ml. The solution must be diluted with 500 ml. of 5 percent dextrose in water before use. The diluted solution is then administered by intravenous infusion during a period of not less than two-and-one-half hours.

Edathamil disodium is considerably more toxic (on a weight for weight basis) than edathamil calcium disodium. With the latter preparation, the calcium affinity of edathamil has been saturated, hence it does not disturb serum calcium levels. Present evidence indicates that the toxicity of edathamil disodium is dependent on both total dosage and speed of administration. No cases of severe hypocalcemia have been as yet reported with this preparation with the recommended dosage and rate of administration. It is suggested, however, that calcium gluconate for intravenous use be available when this preparation is used.[1]

A unique application of edathamil disodium as an antidote has been in the treatment of severe digitalis intoxication. Gubner and Kallman[2] have reported the use of edathamil disodium in 5 cases of severe digitalis intoxication. Chelation of serum by this chemical agent proved effective in abolishing both atrial and ventricular atopic rhythms caused by digitalis. These investigators concluded, "the use of edathamil disodium offers certain advantages over potassium administration in treating digitalis toxicity. Its action is prompt and is safer than intravenous potassium. Oral potassium is slow in effect and large doses are required which may not be well tolerated." In these studies, the usual dosage employed was 600 mg. edathamil disodium administered intravenously in 250 ml. of 5 percent dextrose in water within a half-hour period.

Oral Use of Edathamil in Acute Lead Poisoning

It has been shown that edathamil calcium disodium given orally in the presence of lead in the intestinal tract is a very dangerous drug. Edathamil combines with lead salts in the gastrointestinal tract and promotes their rapid absorption into the blood stream and transport to the brain. It is believed that increased absorption of lead from the intestinal tract may also occur with intravenous administration of edathamil. Therefore, emptying the intestinal tract by enemata may be an important preliminary to treatment with edathamil irrespective of the route of administration. On the other hand, dehydration by severe catharsis should be avoided.[3]

References

1. *Endrate Disodium, Instruction Circular,* Abbott Laboratories.
2. Gubner, S. and Kallman, H.: Treatment of Digitalis Toxicity by Chelation of Serum Calcium, *Am. J. Med. Sci. 234*:136 (Aug.) 1957.
3. Byers, R. K.: Lead Poisoning, *Pediatrics, 23*:585 (Mar.) 1959.

Phosphate Ester Insecticide Poisoning

► A SEVERE CASE OF POISONING FROM AN ORGANIC phosphate ester insecticide was recently reported.[1] This poisoning incident involved a 43-year-old white farm worker who was treated at an Arizona Hospital Poisoning Control Treatment Center. When admitted to the hospital, the poisoning victim was found to be acutely ill and displayed the following symptoms: extreme miosis, salivation, dyspnea, profuse diaphoresis, abdominal cramping, and extreme muscular pain in the arms and legs. He showed typical signs of pulmonary edema with coarse bubbly râles in his chest. He rapidly became unconscious. His blood pressure rose to 200/110 mm. Hg. Subsequent laboratory tests revealed a marked depression of red blood cell cholinesterase activity. It was also noted that the hospital room in which he was confined developed a heavy, unpleasant, sulfur-like odor that resembled that of the common garden insecticide, malathion.

It was learned subsequently that this farm worker had been heavily exposed to the phosphate ester insecticide, thimet, for 2 weeks prior to development of the above symptoms. The victim had been engaged

in replanting cotton in which cotton seed impregnated with thimet was used. Apparently, the worker exercised no precautions with regard to handling the material. The patient's wife stated that the man would come home after a day's work in the field with his trouser legs and other parts of his clothing saturated with the malodorous insecticide. The patient would usually use the same soiled clothing for the next day. The powder from the seeds would also come in contact with exposed parts of his body and legs.

Initial treatment consisted of the intramuscular administration of atropine sulfate. However, his condition became progressively worse and respiration ceased. Artificial respiration by means of a Bennett valve and cyclic manual respiration was employed. Intensive administration of atropine sufate was carried out. Two milligrams of atropine sulfate was administered intravenously every 15 minutes. In addition to atropinization, the patient was digitalized with intravenous lanatoside C (Cedilanid) and the corticosteroid, hydrocortisone (Solu-Cortef), was also administered intravenously. Within 2 hours the patient regained spontaneous respiratory movements, the pupils had dilated slightly and the profuse diaphoresis had diminished. After 6 hours of continued atropinization (a total of 48 mg. of atropine sulfate intravenously), the patient regained consciousness, the pupils were dilated and there was noticeably less pulmonary congestion. Subsequent treatment consisted of intravenous atropine sulfate, 2 mg. every 4 hours for an additional 12 hours, and frequent bathing of the skin with copious amounts of soap and water until the odor of the insecticide from the body surface was no longer apparent. After 12 hours, the acute effects of the intoxication were minimal, and the patient was apparently well on the road to recovery.

The organic phosphate ester insecticides, such as thimet, are extremely potent, useful insecticides that have resulted from research on war gases—in particular, those known as "nerve gases." In addition to the compound thimet, and other insecticides of this class include: parathion, methyl parathion, diazinon, demeton (Systox), T.E.P.P., dipterex, and malathion. These compounds inhibit cholinesterase enzymes throughout the body, resulting in local accumulation of acetylcholine, which produces increased activity of smooth muscle and secretory glands (manifested by nausea, vomiting, diarrhea, miosis, sweating, and increased salivary and bronchial secretion), bradycardia, central nervous system symptoms, and muscular fasciculations and weakness.[2] The organic phosphate esters are absorbed through the skin, respiratory tract, conjunctivae, and the gastrointestinal tract. It has been shown that in agricultural use, absorption through the intact skin is the most frequent route of exposure.[3] By far the greatest number of cases of poisoning from these insecticides occur among unsupervised individuals engaged in some phase of insecticide application.

The medical aspects of poisoning by the insecticidal phosphate esters consist of prevention, detection, and treatment. Prevention of poisoning can be accomplished by education of those occupationally exposed to the compounds regarding the dangers of skin contamination, inhalation, and ingestion. The use of protective clothing and immediate washing of contaminated skin should be advised. Clothing should be changed and thoroughly washed after each exposure.

Detection of phosphate ester poisoning can be accomplished through recognition of the characteristic symptoms of acetylcholine poisoning. Exposure to amounts of phosphate esters which are too low to produce symptoms can be detected by periodic blood cholinesterase measurements, because marked depression of cholinesterase activity of the blood occurs before symptoms are evident. It is thus possible to terminate the exposure or to institute the proper protective measures before poisoning occurs.[3]

It was clearly demonstrated in the above case history that prompt and sustained atropinization is the essence of successful treatment of anticholinesterase intoxication. Atropine, preferably administered intravenously and in quantities much greater than are normally employed, is essential. There appears to be in the minds of some physicians an exaggerated fear of the toxicity of atropine.[3] It has been shown that one of the characteristics of phosphate ester poisoning is an increased tolerance to atropine.[4] Grob and Harvey[4] state, "overatropinization may be incapacitating but presents little danger to life." Overatropinization is recognized by the development of very dry mouth, thirst, hoarseness, dry flushed skin, dilated pupils, blurring of near vision, tachycardia (up to 140 per minute), urinary retention, restlessness, disorientation, maniacal behavior, and increased drowsiness.[4]

Although atropine has been of great benefit in saving the victims of acute poisoning by phosphate esters, its effectiveness is limited to an ability to counteract about 2 or 3 lethal doses.[5] Thus, attempts to prevent poisoning should be continued through education of those who are occupationally exposed concerning the dangers associated with careless handling and misuse of these chemical agents.

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1. Grateful acknowledgment is made to George W. King, M.D., of Tucson, Arizona, for information presented in this report.

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4. Grob, D. and Harvey, A. M.: The Effects and Treatment of Nerve Gas Poisoning, *Am. J. Med.*, *14*:52, 1953.

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News

Course in Preparation of Parenteral Products at Philadelphia

The Seventh Annual Postgraduate Course in the Preparation of Parenteral Products will be held at the Philadelphia College of Pharmacy and Science, July 11 to July 22, 1960. The course which is of particular interest to hospital pharmacists is intended to provide a fundamental training at postgraduate level in the theory and practice of parenteral product manufacture. All persons with undergraduate training and experience providing an adequate foundation for an understanding of the specialized techniques required for the disciplines of parenteral product manufacturers are eligible. The course consists of lectures, laboratory work and field trips.

For application and additional information, write to the Philadelphia College of Pharmacy and Science, 43rd & Kingsessing Avenue, Philadelphia 4, Pennsylvania.

► ASHP PRESIDENT VERNON O. TRYGSTAD was a participant in the Seventh Annual "Pharmacy's Public Health Forum," at Brooklyn College of Pharmacy on April 26. Mr. Trygstad spoke on "Looking Behind the Labels." Other participants in this drug industry-wide program included Dr. Frank M. Berger, President, Wallace Laboratories; Dr. Austin Smith, President, Pharmaceutical Manufacturers Association; Mr. Dudley J. Taw, Vice-President, McKesson & Robbins, Inc.; Major General John K. Cullen, U.S. A.F., M.C., Deputy Surgeon General; and Dr. Percy T. Phillips, Immediate Past-President, American Dental Association.

► ALFRED A. MANNINO has been appointed Manager, Hospital Division, of Geigy Pharmaceuticals, Division of Geigy Chemical Corporation, Ardsley, New York, according to an announcement by Mr. Ernest Hammer, Geigy Pharmaceutical's president. Mr. Mannino, formerly Manager, Hospital Department, McKesson & Robbins, Inc., was associated with that firm since 1949. From 1947-1949, he served as a detail and hospital representative for Merck & Company. Prior to joining Merck, Mr. Mannino was a retail and hospital pharmacist.

Mr. Mannino was graduated in 1942 with the degree of B. S. in Pharmacy from the University of Iowa. Following three and one-half years' service in the U. S. Marine Corps, he took post graduate work at the University of Iowa. He is a member of the American Pharmaceutical Association and the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. He resides with his family at Westfield, New Jersey.

► JOSEPH H. BECKERMAN, currently assistant chief pharmacist, will assume the duties of chief pharmacist at the University of California at Los Angeles Medical Center on April 18, 1960.

Mr. Beckerman, a native of Brooklyn, New York, holds degrees in pharmacy from Long Island University and St. John's University. He has also done graduate work at Fordham University and the University of Southern California.

Prior to 1955 Mr. Beckerman had a number of years' experience in retail pharmacy and also as a special hospital representative for a major pharmaceutical manufacturer.

During World War II he served in the United States Army as a pharmacist with a field hospital. He holds a reserve commission in the United States Public Health Service.

Mr. Beckerman holds membership in the A.Ph.A., the ASHP, Rho Chi, Delta Sigma Theta and has served as past president of the Southern California Society of Hospital Pharmacists.

► JACK S. HEARD, Vice President of the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, assumed the position of Director of Pharmacy Services at St. Francis Memorial Hospital in San Francisco on April 18, 1960. St. Francis is a 330 bed non-profit, nonsectarian general hospital.

Mr. Heard, a native of San Francisco, graduated from the University of California School of Pharmacy in 1943. He was staff pharmacist at the University of California Hospital in San Francisco 1946-1950, Chief Pharmacist at Children's Hospital in San Francisco 1950-1954, and Chief Pharmacist at University of California Hospital in Los Angeles 1954-1960. He served in the U. S. Army Medical Service in World War II and at present is a Captain in the Medical Service Corps of the Army Reserve. He has been president of both the Northern California and the Southern California Society of Hospital Pharmacists.

Miners Memorial Hospital Association Names Rhodes

Wyndal B. Rhodes of Williamson, West Virginia, has been named Director of Pharmaceutical Services for the Miners Memorial Hospital Association, according to Dr. John Newdorp, Medical Administrator. He

will be responsible for the general direction of pharmaceutical services in the ten Miners Memorial Hospitals located in the Appalachian Mountain coal mining area of West Virginia, Kentucky and Virginia.

A native of West Virginia and son of a coal miner, Rhodes received B.S. degrees in chemistry and pharmacy from the West Virginia University. He was born in Boone County but lived in Omar, Logan County for a number of years and graduated from Logan High School.

Following graduation from the College of Pharmacy in 1957, Rhodes was appointed pharmacist at Fairmont Hospital, Fairmont, West Virginia. In May, 1958, he joined the staff of the Miners Memorial Hospital Association as a rotating pharmacist, serving several of the Miners Hospitals in the West Virginia and Northeastern Kentucky part of the chain. His new pharmacy assignment includes more extensive duties with the entire hospital network in three states. The ten hospitals were built and are operated by the Miners Memorial Hospital Association to provide medical care for coal miners and their dependents who are beneficiaries of the United Mine Workers of America Welfare and Retirement Fund but they are open to anyone. Each hospital has a pharmacy. Together the ten hospitals serve over 1,500 outpatients a day and have a capacity of over 1,000 beds.

Rhodes is a member of the American Pharmaceutical Association, the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS, and Southern Appalachian Society of Hospital Pharmacists.

► THE CANADIAN SOCIETY OF HOSPITAL PHARMACISTS has scheduled the Third Canadian Institute of Hospital Pharmacy on August 12, 13, and 14. Meetings will be held at the University Hospital in Saskatoon, Saskatchewan. Mr. O. Buchko of the Department of Pharmacy at University Hospital in Saskatoon is in charge of publicity.

► AT THE 1960 PHARMACY CONGRESS at St. John's University, Jamacia, New York, a special session was devoted to the legal aspects of hospital pharmacy. Participants included Dr. August H. Groeschel, Associate Director for Professional Services at the New York Hospital, and Dr. George F. Archambault, Pharmacist Director of the United States Public Health Service, Washington, D. C.

► THE AMERICAN DRUGGIST BLUE BOOK, 1960-61, listing 174,770 products, is available at $9.00 per copy from the Circulation Department, American Druggist Blue Book, 250 W. 55th Street, New York 19, N. Y.

According to a release from the Company, the edition includes more product descriptions—covering data such as composition, uses, dosage, and packaging—than ever before. Well over 1,400 products are described in the new Blue Book. Another reference feature is the alphabetical index of nearly 7,200 manufacturers—providing company names and address—located at the back of the book.

► ROBERT W. ELKAS, Ph.D., has recently been appointed Technical Assistant to the Director of Quality Control Section at Lederle Laboratories, Pearl River, New York.

► DRUG TOPICS PINK BOOK is a new classified directory of advertised products sold over-the-counter in drug stores. It is also published by the publishers of *Drug Topics Red Book* and is available from Directory Division, Topics Publishing Company, Inc., 10 East 15th Street, New York 3, N. Y., at $8.00 per copy.

► MAXWELL L. LITTMANN, M.D., Ph.D., has recently been appointed scientific director of Endo Laboratories, Richmond Hill, New York, manufacturing pharmaceutical firm. At the same time Endo reports that Nathan Weiner, Ph.D., has been made Director of Research.

Fay Peck, Jr., Assistant Pharmacist-in-Chief at Albany Hospital, Albany, N. Y. reviews department policies with Halit Okcuoglu, a student from Turkey under the Visitors Exchange Program. Chief Pharmacist Louis P. Jeffrey (left) looks on

News

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Mercy Hospital and Duquesne Offer Graduate Program

The Mercy Hospital of Pittsburgh, Pennsylvania, in cooperation with the Graduate School and the School of Pharmacy of Duquesne University, announces the combined Graduate Study-Residency Program in Hospital Pharmacy starting June 1 or July 1, 1960. The program is designed to meet the Minimum Standard for Pharmacy Internships in Hospitals as specified by the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. Upon satisfactory completion of the program, the Master of Science degree will be conferred by Duquesne University and a Certificate of Residency in Hospital Pharmacy will be awarded by the hospital.

Appointments to the residency are for a period of two years beginning June 1 or July 1, 1960. The first year of residency will consist of training in the various sub-divisions of the pharmacy department in accordance with prescribed rotational periods. Training will consist of outpatient dispensing, inpatient dispensing, bulk compounding of sterile and non-sterile products, and hospital pharmacy administration. In addition, the resident will actively participate in teaching pharmacology courses in the School of Nursing. The residency program will emphasize the pharmacy department's relationship in the total hospital picture by means of regular meetings and discussions with members of such hospital departments as dietetics, accounting, physical and occupational therapy, laboratory, isotopes, anesthesia, and medical social service. In addition, the resident will participate in interdepartmental research projects. Full-time training in Mercy Hospital will be required during the summer of 1960. The Mercy Hospital will provide room and board at no charge in addition to a stipend of $200.00 per month during the first year of residency. Upon completion of one year of hospital training, the resident will begin academic training at Duquesne University in July of the second year. The stipend during this phase of the program will be $150.00 per month for 12 months. In addition, University tuition fees may be waived for those residents applying for graduate laboratory assistantships in the School of Pharmacy.

Applications for the year beginning June 1 or July 1, 1960 should be filed before May 31, 1960. Applicants for the residency must have a B. S. degree from an accredited School of Pharmacy and be capable of fulfilling the requirements for admission to the Graduate School of Duquesne University. Undergraduates may apply before graduation but must submit proof of graduation before the appointment is accepted. Additional information and application blanks may be obtained from: Dean John G. Adams, School of Pharmacy, Duquesne University, Pittsburgh 19, Pa.; or Sister Mary Gonzales (Duffy), Chief Pharmacist, Mercy Hospital, Pittsburgh, 19, Pa.

Oliver to Palo-Alto

John A. Oliver has been appointed chief pharmacist at the Palo Alto-Stanford Hospitals, in Palo Alto, California. Mr. Oliver will receive a Master's Degree in Hospital Pharmacy and complete an internship in hospital pharmacy at the University of Michigan and the University Hospital in Ann Arbor in June 1960.

Mr. Oliver is a 1951 graduate of the Washington State University School of Pharmacy, and is a registered pharmacist in Washington and California. For four years following graduation, he served as a medical service representative for Parke, Davis and Company in Southern California, and then held a position in a professional pharmacy for a year and a half.

In 1956, Mr. Oliver assumed the responsibility for the pharmacy service at Scripps Clinic and Research Foundation in La Jolla, California, and remained there until September 1958 when he began his graduate studies and internship program at the University of Michigan.

► "THE NEUROLOGIC ACTIONS of Phenothiazine Compounds," is the title of a film recently released by Smith Kline and French Laboratories, Philadelphia. The 30-minute, color presentation is designed as a discussion film for staff psychiatrists, physicians and nurses in mental hospitals as well as for the neuropsychiatric staffs in general hospitals.

Produced for Smith Kline and French by Ansel Film Studios, Inc., the 16 mm. film is presently available on a free loan basis only to professional personnel in the psychiatric field.

► ALTHOUGH ACCIDENTS, the fourth leading cause of death, are responsible for about 6 percent of all deaths in the United States today, the Health News Institute reminds us that they play a much larger part in the death rates for specific age groups in our population. For preschoolers, aged 1-4, accidents constitute the leading cause of death, taking approximately 4,700 lives annually. Despite the fact that most childhood accidents are preventable, they cause about twice as many deaths as pneumonia and nearly 3 times as many as all forms of cancer.

As the vice-president sees it—

JACK S. HEARD, *St. Francis Memorial Hospital, San Francisco, California*

► WHEN THIS PAGE comes to your attention, I will have been in my new position for more than a month. At the time of writing the page I am in my last week at the UCLA Medical Center. Those of you who have changed positions from one city to another and left your families behind while selling your home and letting the children finish school are probably aware of the number of problems that can be on one's mind at the same time. However, it is my intention and hope to continue serving the SOCIETY as much as possible in my new position.

"A New Concept in Hospital Pharmacies"

Many of you have probably read the article entitled "A New Concept in Hospital Pharmacies" by Donald C. Carner, Administrator of Seaside Memorial Hospital, Long Beach, California. This article appeared in the *Tile and Till* for March-April 1960. At the Seaside Memorial Hospital a new wing of 400 beds is being built. This wing is composed of four floors of 100 patients each. Each floor will have a small sub-pharmacy with one pharmacist stationed there. This pharmacist will be part of the overall pharmacy department and his unit will be connected to the main pharmacy by an automatic elevator, a direct dial telephone, and a pneumatic tube system. It is expected that this pharmacist will provide much more direct service to the patient, the physician, and the nurse than we are able to do from a central pharmacy. The pharmacist will, according to Mr. Carner, have responsibility for supervising and operating the Nurses Unit Utility Service and control oxygen, dressing trays, and intravenous solutions as well as dispensing medications.

Mr. Claude Simpson, Chief Pharmacist of Seaside Memorial Hospital, has informed me that this new wing of this hospital with the new pharmacy concept will open about July 1st. As most of you have probably noticed, there has been a notice in the Positions Open Section in the JOURNAL requesting applicants for positions in this hospital. At the present time applicants are still being accepted. It will be interesting to watch this new approach to hospital pharmacy, and its effect on the field in general.

Executive Committee Activities

In February I had the interesting and worthwhile experience of attending the Executive Committee meeting in Washington, D. C. Information regarding our actions and deliberations will probably be printed in this and succeeding issues of the JOURNAL. What struck me, and is still with me, is the ease and rapidity with which one may now attend meetings across the country by jet flight and return while losing very little extra time from one's work or family. Before the days of transcontinental airliners, not to mention jet flights, the affairs of a national society sometimes seemed rather remote to those who were not near the center of activity of the society. It was difficult to sell many people in our local chapters on the value of national membership. One perhaps could draw a parallel to the wide spread isolationist feeling that many people had in this country prior to World War II as compared with the much more common international awareness that our populace now has. This shrinking world is certainly just as applicable to our hospital pharmacy affairs. With the ability of officers and committeemen to get quickly to and from important meetings and the greater ease for the membership at large to attend the Annual Meeting, it is much more possible now for our SOCIETY to act as a group in the interests of hospital pharmacy than it was even a few short years ago when the SOCIETY was formed. While not very many of us are involved in international hospital pharmacy activities as yet, it is very easy to see that the hospital pharmacists active in national affairs today may be just as active in international affairs within a few years. I have not yet projected my thoughts into outer space but am leaving that for Claude Busick and Don Francke!

Jack S. Heard

ABSTRACTS OF PAPERS

presented at the 19th International Congress of Pharmaceutical Sciences of the International Pharmaceutical Federation Zurich, Switzerland, September, 1959

A series of abstracts presented at the 19th International Congress of Pharmaceutical Sciences of the International Pharmaceutical Federation is appearing in THE JOURNAL. The first of the series were those presented in English and appeared in the January issue. In the second series appearing in March, the English abstracts were continued and the beginning of those translated from the German were included. Here, in the third series, abstracts translated from the German are concluded. A future issue will include abstracts from the French.

AZULENES

The Chromatography of the Azulenes (Zur Chromatographie der Azulene), by W. Ritschel. (Laboratorium für Pharm. Forschung der BIOCHEMIE GmbH, Kundl, Österreich.)

Knessl and *Vlastiborova* developed a very good method for chromatographic separation and determination of azulenes according to their qualities, employing concentrated mineral acids to form azulenium ions. In this method the chromatographic paper is saturated with a mixture of vaseline oil and petroleum ether. As the mobile phase, phosphoric acid of higher percentage is being used.

While this method is very well suited for institutes and laboratories a simpler method shall be published here which permits, without previous preparation, the direct chromatography of azulenes. The latter method will meet the needs particularly of the retail pharmacy-laboratory for orientation tests of azulene-containing preparations.

Method: Chromatographic paper No. 2043 'acetylated' of the Schleicher & Schüll company is being used. The azulene samples are being dissolved in quantities of 50-100 mg. (referring to the azulene content) and put onto the starting line with a micropipette. After saturation a mixture of benzene:chloroform:isopropanol= 1:27:7 is being used.

The azulenes will form spots in their natural color. To better the visibility the chromatogram may be sprayed with p-dimethylaminobenzaldehyde in glacial acetic acid and phosphoric acid, or with a mixture of formaldehyde, citric acid and glacial acetic acid. After drying at 110°C. the blue colored azulenes (chamazulene, guajazulene and lactarazulene) appear green, the pink colored lactarviolin turns to violet. Reproduceable R_f-values were obtained.

OPHTHALMIC OINTMENT BASES

Rheological Measurements Using Ophthalmic Ointment Bases of Hydrocarbons (Rheologische Messungen an Augensalbengrundlagen aus Kohlenwasserstoffen), by Grete Kragh Nielsen. (Visitatorernes Laboratorium, Kopenhagen, Dänemark, und Pharmazeut. Forschungsabteilung der F. Hoffman-La Roche und Company AG, Basel, Schweiz.)

The rheograms (flowing curves) of the different rheological bodies and the concepts of flowing point f, plastic viscosity U, and thixotrophic constant M are explained.

The Epprecht Rheomat 15 which was used in performing the rheological measurements is being demonstrated, and the calculation of the thrust T and deformation velocity D is discussed. Waterfree eye ointments consist mainly of hydrocarbon gels (HC-Gels) consisting of apt mixtures of Vaseline and liquid paraffin. Lanolin is then added when the moistening of the eye mucosa must be improved, or when water must be emulsified (w/o-emulsion).

By the increased addition of liquid paraffin to Vaseline the flowing point, the plastic viscosity and the thixotropic-constant M are constantly reduced. An addition of 10% wool fat reduces these values still further.

The importance of these rheological values for the qualities, the judging and the rheological forming of HC-ophthalmic ointments is discussed.

TABLET DISINTEGRATION

Studies on the Tablet Sector (Studien auf dem Tablettengebiet), by W. Awe, H. Gelbrecht, H. J. Freudenstein, K. H. Stepke and Adel Riad. (Institut für Angewandte Pharmazie, Technische Hochschule, Braunschweig, Deutschland.)

Starting on the basis that tablets for peroral use should disintegrate in water at 20°C. within ½ to 1 minute if possible, and also that they should not exceed 10% filler, when 0.2 - 0.5 Gm. in weight, the authors examined as distintegrator sodium carboxymethylcellulose and obtained good disintegration times, usually better ones than prescribed in pharmaceutical books. Other additional substances were examined in various manners, e.g. the defatted milk powder which was especially proposed in exchange for talcum.

The authors' experiences prove that the disintegration time of one minute is easily reached and that the addition of disintegrators, lubricants and anti-adhesives, and if necessary other additional substances, ought not to exceed 10% except in just a few cases.

Formaldehydecasein, which has proven itself again and again in three years of testing, is newly recommended by the authors. Sodium carboxymethylcellulose has proven itself especially well as disintegrator for the inner core and the outer layer of coated tablets.

FRIABILITY OF TABLETS

The Roche-Friabilator, A Test Apparatus for Tablets for Losses in Rolling and Falling (Der Roche-Friabilator, ein Tablettenprüfgerät auf Roll-und Fallverschleiss), by K. Schaub. (Pharmaz. Forschungsabteilung der F. Hoffman-La Roche und Company AG, Basel, Schweiz.)

The Roche-friabilator consists of a rotating plexiglas drum in which the rolling and falling of the tablets is provoked by a swinging bridge.

The percentage of weight loss of the tablets after exposure to the friabilator is cited as the rolling and falling loss.

The authors examined the influx of the roll and falling-loss by a change in the
—size of the tablets
—form of the tablets
—number of tablets
—turning velocity of the drum, and
—duration of the test.
By choosing carefully the test conditions, the spreading of the test results can be kept low.

There is no general border-line value for the rolling and falling-loss of tablets in the Roche-friabilator. The manufacturer has his own test conditions for each of his products and he must find his own norm according to the requirements made of the tablet (e.g. packaging in rolls or in bulk; short or long transportation; lozenges or chewing tablets).

The relations of the rolling and falling-loss in the Roche-friabilator as compared to other tablet test methods are being discussed.

ANTIBINDING AGENTS

The Influence of Silicone Emulsions on the Disintegration Time of Tablets (Der Einfluss von Silikonemulsion auf die Zerfallszeit von Tabletten), by W. Merz. (Hirsch-Apotheke, Reutlingen, Deutschland.)

The author, in 1955, proposed for the first time the use of silicone emulsions as anti-binding substance for the manufacture of tablets. The statements he made at that time were mainly limited to lozenges (glucose-cores, peppermint tablets) where the disintegration time does not matter. In continuing these tests it could be shown that silicone emulsion may be used also for all perorally applied tablets as anti-adhesive. Of decisive importance is the type of emulsion oil/water and the structure of the emulgator used. The silicone-emulsion possesses a few important advantages as compared to the so called 'fatty' anti-adhesives used so far: silicone emulsion is not hydrophobic, it has neither taste nor smell, does not get rancid and does not hold up the disintegration of the tablets. Such tablets do not harden after a longer period of storage as has so often been observed in the use of tablets with magnesium stearate. Results are being reported on various tablet lots stored for 2-½ years. The tablets were pressed with silicone oil resp. silicone-emulsion with or without addition of aerosile. In these cases tablets with 0.25% silicone-emulsion dissolved even after a storage of 2-½ years within 12 to 25 seconds. If the silicone-emulsion was not added directly to the granulation liquid but, in the form of siliconated talcum, powdered as 'external phase' upon the tablet granulate, the dissolution time even after 2-½ years amounts to 25 seconds. In a cross-test, tablets with talc stearate showed the expected longer dissolution time of barely 2 minutes. An addition of aerosil to the tablet mass did not prove to be of decisive influence.

NEW FATTY OINTMENTS

Preliminary Report on a New Fatty Ointment Base (Vorläufige Mitteilung über eine neue Fettsalbengrundlage), by F. Neuwald. (Universität, Hamburg, Deutschland.)

A suitable fatty ointment base, which combines the advantages of the lard and the hydrogenated peanut oil for ointment therapy and cosmetics, without showing their main disadvantage which is short durability, has so far not yet been found. The author now has found that an ointment base of the consistency of lard can be produced, containing a mixture of natural saturated fatty acids with 8-12 C-atoms, in which the C_8-share dominates, and of natural saturated fatty acids with 18-22 C-atoms in relation 60:40, in equal portions with glycerin esterated. It will be reported later, in a different place, on the galenic qualities, the pharmaceutical-technical, and the clinical tests of this triglycerid base.

GUAR MUCILAGES

The Influence of the Manufacturing Method and of the Hydrogen Ion Concentration upon the Viscosity of the Guar-gum Mucilages (Der Einfluss der Herstellungsmethode und der Wasserstoffionenkonzentration auf die Viskosität von Guar-Gummi-Schleimen), by Rosmarie Bolliger. (Pharmaz. Forschungsabteilung F. Hoffmann-La Roche AG, Basel, Schweiz.)

Guar-gum consists mainly of guaran, a non-ionic, highly polymeric poly-saccharide consisting of mannose-chains with galactose as side-chains.

Guar-mucilages give pseudoplastic (quasiviscose) flowing curves. The obtainable values of viscosity are very much dependent upon the method of production.

Obviously the meal of the guar seeds contains enzymes which are capable of splitting the polygalactomannose-chains and thus causing a loss of viscosity. The enzymes can be destroyed by heating the aqueous unbuffered mucilages for 30 minutes at 100°C. without damaging the polysaccharides. Heated mucilages show higher values of viscosity and a better stability of viscosity than the non-heated ones.

As in other mucilages the initial wetting of the guar-gum with non-solvents (ethanol, glycerin, polyoles) is advantageous for the hydration, but their addition can be effected only up to a certain quantity because otherwise dehydration sets in.

The highest viscosity values are reached in the pH values 5-8, regardless of whether or not they are fixed with hydrochloric acid, sodium hydroxide or phosphate buffers. Minimum viscosity is found at the pH values 3 and 10.

The viscosity values of the sufficiently preserved and de-enzymatized guar-mucilages remain fairly constant after they are fully hydrated at a pH optimum of 5-7 in buffered, and of 6-8 in unbuffered solutions. This fact is especially remarkable as the mucilages of natural polysaccharides generally are more inclined to a depolymerization.

TWEENS

Contribution to the Knowledge of Solubilization by Tweens (Beitrag zur Kenntnis der Lösungsvermittlung durch Tweens), by St. Éllö. (Ungarische Pharmakopöekomission, Budapest, Ungarn.)

Almost empirical data only has been published about the quantity of Tweens to be used for the solubilization of various aqueous soluble materials. The author tried to comprehend the very complex question by using the relation material : Tween by aqueous titration (cloud point) and to register the results graphically. He used volatile oils such as peppermint, fennel and cassia-cinnamon, as the substances to be solubilized. He tested how much Tween 20, 40, 60, and 80 is required for the solubilization of increasing quantities of the volatile oils, resp. with what quantity of water in different oil: Tween relations the cloud point is reached.

EFFECTS OF VOLATILE OILS

Phytodynamic Effect of Volatile Oils (Phytodynamische Wirkung der ätherischen Öle), by L. Barbalić. (Pharmazeutische Fakultät, Zagreb, Jugoslawien.)

The pharmaco-dynamic effect of the volatile oils is well known today. In comparison the phytodynamic effect of the volatile oils is less well known. This effect has been tested only for a very limited number of different volatile oils and with superficial and insufficient tests.

The volatile oils represent in general the most important effective materials of aromatic plants. Since such plants are often found in nature they have an important part in the composition of vegetation of a region. For this reason it was decided to do research on the possibilities of their phytodynamic effects. Based on the results it was reported that the applied volatile oils hinder some life phenomenon of the test plants.

JAVANESE ELEMI

On an Elemi from Java of Canarium vulgara Leenh. (Canary-nut tree) (Über ein Elemi aus Java von Canarium vulgare Leenh.), by M. K. Messmer. (Girol AG, Zürich, Schweiz.)

The Burseracee *Canarium vulgare* Leenh. (*C. commune* L. Mant.) is closely related to the mother plant of the Manila-elemi (*Canarium luzonicum* (Blume) Asa Gray). *Canarium vulgare* is native to the Kangean and Bawean islands in East Java, the small Sundaes (Timor, Wetar, Tanimbar), Celebes, and the Moluccas. It is cultivated in the remaining parts of the East Indian archipelagos and in the tropical regions of the entire world. The beautiful tropical tree reaches a height up to 150 feet, serving as a shade tree and for the formation of allees, and furnishes wood, edible seeds, fat-seed-oil and a resinous balsam (elemi).

The present elemi was taken from a tree in Djakarta (Java). After slicing the trunk with a knife the resinous balsam started immediately to flow and could be harvested on the following day.

This elemi corresponds to the demands of the Ph.H.V. in relation to its appearance, consistency, smell, and taste. It meets the test requirements for amyrin, ether solubility, acid number, and ash. It also colors red with diluted sulfuric acid like Manila elemi.

The species *Canarium vulgare* may serve for obtaining elemi as well as the *Canarium luzonicum* because the Ph.H.V. admits other Burseracee also. The secretion discharge of resinous substance from *Canarium luzonicum* is much larger, this is the reason that it has the greater importance for the harvesting of elemi.

Older elemi found on the trunk and originating from former wounds is hard and of a white color. Its acid number was increased, the volatile oil content reduced. It is pharmaceutically of minor value. In order to avoid losses of volatile oil the freshly harvested elemi must immediately be stored in well closed containers. In tropical climates the exsiccation is very rapid.

*Ph.H.V.=*Pharmacopoeia Helvetica*, Fifth Edition.

OXIDATION OF CHLORPROMAZINE

Kinetics of Oxidation of Chlorpromazine and Its Examination with a High-frequency Titrimeter (Oxydationskinetik des Chlorpromazins und deren Untersuchung mit einem Hochfrequenztitrimeter), by E. Pungor. (Universität Eötvös Loránd, Budapest, Ungarn.)

In an aqueous solution of chlorpromazine the oxygen present causes an oxidative reaction. This can be observed in the intensive color change of the solution. At the same time the pH and the conductivity of the system changes. To clear up the oxidative mechanism the oxidation was carried out with $K_2S_2O_8$ and it was established that two oxygen equivalents per molecule chlorpromazine were taken up and the reaction takes place at a medium rate. Two molecules of the so originated product react together at a slower rate in a secondary reaction producing again, a colorless substance by formation of hydrogen ions. The kinetic of the acid formation and the observation of the decline in color gives the information that the oxidized chlorpromazine changes to a stable dimeric form.

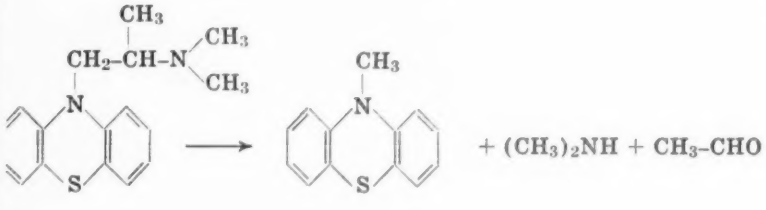
In chlorpromazine solutions containing oxygen a photocatalysis of oxidation is perceptible. The acid formed during the reaction causes an auto-catalysis. In case of an adequate buffer effect, e.g. using chlorpromazine acetate instead of the chlorpromazine chloride, the rate of the decomposition is largely diminished. The decomposition reaction is observable too in closed ampuls, with the spectrum and by high-frequency assays.

Relative to the above mentioned it is not possible to make any definite statement, on the basis of the light absorption assays regarding the presence or not of decomposition of the chlorpromazine during storage. since the initial as well as the oxidated substance is colorless. The high-frequency titrimeter, however, can differentiate in this instance.

PHENOTHIAZINE DERIVATIVES

On the Stability of Aqueous Solutions of Several Phenothiazine Derivatives (Über die Stabilität von wässerigen Lösungen einiger Phenothiazinderivate), by T. Waaler. (Pharmazeutisches Institut, Universität, Oslo, Norwegen.)

In the manufacture of parenteral solutions of promethazine hydrochloride, non-stabilized aqueous solutions show strong coloring after a short time, especially under the influence of light. In heating such unstabilized solutions, the molecule splits forming 10-methylphenothiazine, dimethylamine and acetaldehyde:



A probable mechanism of the splitting and the formation of color were discussed with the aid of related substances and the influence of different stabilization substances was pointed out.

TRITERPENES OF SAGE

New Results on the Triterpenes of Sage Leaves (Neue Ergebnisse über die Triterpene der Salbeiblätter), by C. H. Brieskorn. (Pharmazeutisch-chemisches Institut, Universität, Tübingen, Deutschland.)

In isolating ursol acid and oleanol acid from sage (*Salvia off.*), it was noted that the single fractions of both acids have very different melting points. Only a relatively small part of the crystallisates have the most often indicated melting points of 285°C. for ursol acid and 308°C. for oleanol acid. The other crystallizing fractions lie about 10 degrees or more below these melting points. Other authors, in similar studies, reached the same conclusion, but they not always reached the necessary consequences. This explains why the melting points of both acids differ widely in literature and why therefore, the reference is made that of the triterpenes, only melting points of the derivatives, but not those of the natural substances, are binding.

The author thinks that the fluctuations of the melting points observed are caused by added substances which may have solubilization properties similar to ursol acid and oleanol acid, which can therefore be separated from them only in a very insufficient way. By using an improved procedure it is possible to obtain ursanol acid and oleanol acid of the above mentioned melting points from sage leaves in much greater yield. At the same time small quantities of other triterpenes are being isolated that may cause the m.p. depressions.

ALKALOID STABILITY OF PARENTERAL SOLUTIONS

On the Possibility of a Stability Test of Some Alkaloids in Parenteral Solutions (Über die Möglichkeit einer Haltbarkeitsprüfung einiger Alkaloide in Injektionslösungen), by V. Parrák, O. Mohelská and F. Machovicová. (Staatliches Institut für Arzneimittelkontrolle, Bratislava, Tschechoslowakei.)

The authors know from experience that the injectable solutions of a few alkaloids, when stored, in spite of stabilization take on a different color, a color which may be partly caused by decomposition. In the present work they studied the alkaloids, papaverine and apomorphine, which are built according to the isoquinoline and isoquinoline-phenanthrene system and which are discussed in most pharmaceutical books. By the use of paper chromatography they succeeded in separating the effective substance from the decomposition product (oxidation product) and from the stabilizers used.

In the present work several factors were examined which influence the rapidity of decomposition such as concentration, pH values, temperature, and light. By photometrical and spectrophotometrical studies a complicated mechanism of reactions was cleared (in apomorphine), and the formation of a larger number of colored components was determined.

For a quick differentiation the oscillographical polarography is very effective. The oscillographical analysis was particularly effective in the examination of the above mentioned alkaloids because the oscillographical results of the function $dV/dt=f_1/V$ varied greatly.

FAT EMULSIONS

The Oxidation of Fats in Emulsions (Die Oxydation von Fetten in Emulsionen), by Per Finholt. (Pharmazeutisches Institut, Universität, Oslo, Norwegen.)

It is the objective of this work to examine the following problems: 1. How quickly does the fat-oxidation occur in emulsions? 2. Which factors influence the speed of oxidation?

In order to be able to follow the oxidation of the fats the author worked out a method for the quantitative evaluation of peroxides in emulsions. The method is a modification of the well known method by Wheeler.

The influence of the water contents as well as that of the eventual air contents of the emulsion in the determination of peroxides was examined. Comparable tests on the speed of oxidation in the following systems were effected: fat alone, fat and emulgator, fat and emulgator and water in the form of an emulsion. Some emulsifiers speed up the oxidation of fat (pro-oxidative effect), others hinder it (anti-oxidative effect). To be able to answer the question if perhaps the pro-oxidative effect is being caused by the copper contents of the emulsifiers, a method was devised to quantitatively determine the copper in emulsifiers and in fats. The author tested whether or not the relation between copper contents and pro-oxidative effect of emulsifiers was completely clear. Further the pro-oxidative effect of copper in emulsions was studied whereby the copper was introduced either as copper oleate to the fat phase or as copper sulfate to the aqueous phase.

VITAMIN A STABILITY

On the Stability of Vitamin A in Ointments (Über die Stabilität des Vitamin A in Salben), by F. Dal Brollo, G. Polasek und S. Rigamonti. (Farmitalia-Stabilimento, Mailand, Italien.)

To test the stability of vitamin A in ointments, three ointment bases which are often pharmaceutically employed, were manufactured. The ointment bases correspond to the following three main groups: water-free, water containing, and "oil in water."

(a) Base No. 1—water free:

Rx.	White petrolatum	23.7
	Liquid petrolatum	10.0
	Eutanol®	10.0
	Amphocerin®	50.0

(b) Base No. 2—water containing:

Rx.	Sodium alginate	3.2
	Glycerin	10.0
	Distilled water	75.5

(c) Base No. 3—"oil in water":

Rx.	Lanetta N®	15.0
	Spermaceti	10.0
	Liquid petrolatum	5.0
	Glycerin	10.0
	Distilled water	53.7

Parallel to the above mentioned series of bases a further series of ointments were prepared, which differed from the first only by the addition of antioxidants, chosen on the basis of earlier experience—a mixture of 0.05% butylhydroxyanisol with 0.05% ascorbylpalmitate was used as stabilizing agents.

For the tests, as far as the vitamin A is concerned, the palmitate was chosen; it was added to the base in a concentration of 50,000 I.U. vitamin A to one gram of ointment.

The various ointments were packed in tin tubes. Part of them were stored at room temperature, the other part in a thermostat set at 40°C. At regular intervals the contents of vitamin A were tested by analysis. The results of the analytical controls are mentioned and the resulting conclusions are discussed.

PLASTICS AND PARENTERALS

Influence of Plastic Containers on Parenteral Solutions and I.V. Fluids (Beeinflussung von Infusions—und Injektionslösungen durch Behälter aus Kunststoff), by K. Bucher. (Laboratorien Hausmann AG., St. Gallen, Schweiz.)

In an earlier work it was shown that a number of plastic materials, which are in use as containers for pharmaceutical solutions, introduce foreign substances into the solutions. There is danger that the quality of the pharmaceutical products is thereby being changed. In the present study the author tried to determine the qualitative relations of such effects, and the conditions of the sterilization at 100°C. were chosen as the procedure of extraction. It was possible to determine that the extraction effect continues after repeated sterilization and extractive substances reached remarkable values which exceed by far the quantities allowed by the Ph. H. V. (*Pharmacopoeia Helvetica*, 5th edition) for distilled water, e.g. in flexible polyvinylchloride-folia. In polyethylenes the conditions are more favorable; for these, folia values were found which were still within the quantities permitted by the Ph. H. V.

MASKED INCOMPATIBILITIES

"Masked" Incompatibilities in External Remedies (Larvierte Inkompatibilitäten in äusseren Heilmitteln), by H. v. Czetsch-Lindenwald. (Pharmazeutische Fakultät, Universität, Alexandrien, V.A.R.)

The author coined the expression "masked" for all those incompatibilities which by themselves are not externally perceptible, but in which nevertheless certain forces, generally those of chemico-physical nature, diminish or even destroy the therapeutical effect.

In external remedies and also in suppositories an increased importance has to be attributed to processes which may act in this sense, mentioned in the following:

1. Adsorptions:
   (a) by adsorbing pigments, such as kaolin, bentonite, aerosil;
   (b) by water-soluble colloids, such as alginates, gums, CMC, and CM;
   (c) by lipophilic parts, such as the external phase of w/o emulsions.
2. By the absence or by an incorrectly arranged solution gradient.
3. By an osmotic stream which is opposed to the resorption pathways.
4. By hidden physical processes:
   (a) the "walling-up phenomenon";
   (b) the formation of semipermeable membranes;
   (c) the affect of wetting agents.

By means of experiments it was demonstrated that every single group mentioned above challenges the therapeutical results. Thus for instance, (1) a powder in which the fat is bound by an adsorbens does not fatten, (2) an ointment (w/o emulsion type) in which the water-soluble active substance has been absorbed by the fat, is probably non-effective, and (3) a suppository of this very same kind is certainly not effective at all.

The absence of the solution gradient in the case of ointments, watery in nature, is also of decisive importance. Thus for instance, an effective substance particularly well soluble in polyglycol ointments, but poorly soluble in water, will remain in the ointment and has no chance to diffuse into the skin.

The "walling-up phenomenon" appears then, when an *active* substance is surrounded by the drug carrier in such a manner that this active substance cannot diffuse towards the outside.

Wetting agents draw on the skin and may interfere with the effect of the ointment. In addition, they change the Ca^{-}, Al^{-}, and Mg^{-} stearates, which usually do not adsorb due to their hydrophobic character, into strong adsorbents.

The report concludes with the request to pay increased attention to such "masked" incompatibilities between the different components and the auxiliary mediums.

CHROMATOGRAPHIC METHODS

Chromatographic Examinations of the Alkaloids of Zygophyllum fabago L.(Chromatographische Untersuchungen der Alkaloide von Zygophyllum fabago L.), B. Borkowski. (Institut für Arzneipflanzenforschung, Poznán, Polen.)

In search for a plant similar in effect to the *Passiflora incarnata* L. in which *Neu* has found 3-methyl-4-carbolin, *Zygophyllum fabago* L. from the family Zygophyllaceae was investigated. In Poland this kind grows in only one location, probably wild.

The pulverized drug (leaves or roots) are extracted with 1% hydrochloric acid, the extract is alkalized to pH 10, the free bases exhaustively extracted with chloroform, then transferred once more into salts, and after renewed alkalization transferred into ether. After eliminating the ether the residue was chromatographically tested. From the twelve solution-mixtures applied the following gave the best results:

1. n-Butanol: Glacial acetic acid (30:1), saturated with water.
2. Carbon tetrachloride: Benzene : Chloroform (4:1:3).
3. Carbon tetrachloride : Benzene : Methanol (4:1:1).

Harman, harmin and harmol, all of chromatographic purity, were used as standards.

The descending chromatography on Whatman filter paper No. 3, impregnated with 1% Na_2HPO_4 and with the solution mixture 1, on a course of about 40 cm. during 20 hours, showed the following R_f-values.

Alkaloid	Eichsubstanz	Fraktion aus Wurzeln	Fraktion aus Blättern	Fluoreszenz im UV-Licht
Substanz A	—	0,26—0,28	—	türkisblau
Substanz B	—	0,54—0,56	0,54—0,57	violett
Harmin	0,69—0,70	0,69—0,70	0,69—0,70	blau
Harmol	0,69—0,71	0,69—0,71	0,69—0,71	violett-blau
Harman	0,78—0,80	0,78—0,80	0,78—0,80	dunkelblau

The descending chromatography of the complex of the alkaloid bases on Whatman filter paper No. 4 impregnated with a 1% Na_2HPO_4 solution, with the solution mixture 2, on a course of 38 cm. showed only 4 spots.

Alkaloid	Eichsubstanz	Fraktion aus Wurzeln	Fluoreszenz im UV-Licht
Harmol	0	0	violett-blau
Harmin	0,46—0,48	0,47—0,48	blau
Harman	0,68—0,69	0,70—0,72	dunkelblau
Substanz A + B	—	0,92—0,93	blau-violett

The best separation was reached with the solution mixture 3. The third combination showed the results obtained on Whatman No. 1 paper without impregnation during a course of about 8-10 hours with system 3.

Alkaloid	Eichsubstanz	Alkaloidfraktion aus den Wurzeln
Harmol	0,055	0,06
Harmin	0,24	0,24
Harman	0,49	0,48
Substanz A	—	0,80
Substanz B	—	0,90

The spots of all these substances discolored after spraying with Dragendorff's reagent according to *Amelink*.

The addition of standard substances to the alkaloid fraction gained from the drug does not increase the number of spots on the chromatograms but only results in their increased intensity.

On the basis of these assays it is probable that harman, harmin, and harmol exist in *Zygophyllum fabago* L.. The latter of these substances has so far not been proven in genuine form in plant material. Two of the above mentioned, substances A and B, unfortunately cannot be further determined without isolation.

Harman, harmin, and harmol were also determined in five commercial samples of *Passiflora incarnata* L. (unpublished research of J. Lutomski of our institute).

The total contents of alkaloids in the roots of *Zygophyllum* fabago L. amounts to 0.057% calculated on harman; the determination was carried out colorimetrically with the help of p-dimethylamino-benzaldehyde.

After the chromatographical separation and elution of the spots the methanol extract of the roots showed 0.014% harman, and 0.007% harmin.

The remaining combinations were not ascertained because of a lack of standard curves.

The abstracts in this series were translated from the German by Mr. Otmar M. Netzer of the School of Pharmacy, San Francisco Medical Center, University of California, San Francisco,

CURRENT LITERATURE

. . . also calling your attention to the following articles appearing in recent hospital and pharmaceutical journals

. . . . . .

ADMINISTRATION

—Pricing

Sister Mary Berenice: What Governs Pharmacy Charges, *Hosp. Progress* 41:100 (Apr.) 1960.

—Purchasing

Markel, Charles: Establishing A Centralized Purchasing Department in a General Hospital, *Hosp. Management* 89: 120 (May) 1960.

—Storage

Fus, Frank A., and Flack, Herbert L.: A Review of Refrigerators for Pharmaceuticals on the Nursing Units, *Hosp. Management* 89:88 (Mar.) 1960.

FLOOR PLANS AND PLANNING

Lumb, Irene: Library into Pharmacy, *Public Pharmacist* (Great Britain)17:100 (Apr.) 1960.

LAWS AND REGULATIONS

Neibel, Oliver J., Jr., Austin, Philip A., and Bailey, Al J.: Realistic Standards for Hospital Pharmacy Services, *Hospitals* 34:62 (Apr. 1) 1960. (Same article as one entitled "Patient Oriented Hospital Standards," which appeared in the April issue of the AMERICAN JOURNAL OF HOSPITAL PHARMACY.)

OUTPATIENT SERVICE

Collins, Glenn J.: Hospital Outpatient Service and Sound Planning, *U. S. Armed Forces Med. J.* 11:516 (May) 1960.

DRUG EVALUATIONS

by the Council on Drugs of the American Medical Association

► THE FOLLOWING MONOGRAPHS and supplemental statements on drugs have been authorized by the Council on Drugs of the American Medical Association for publication and inclusion in *New and Nonofficial Drugs*. They are based upon the evaluation of available scientific data and reports of investigations.

The issue of the *Journal of the American Medical Association* from which each monograph has been taken is noted under each monograph. Monographs in this issue of the JOURNAL include those published in the *A.M.A. Journal* for February 13, February 27 and March 5, 1960.*

Notice

New and Nonofficial Drugs 1960 is now available from your local bookstore and from the publishers, J. B. Lippincott Company, Philadelphia, Pa. This 1960 edition contains monographs of drugs evaluated by the Council on Drugs of the American Medical Association and published in the Journal of the A.M.A. to October 17, 1959. The indexes listed below contain those drugs evaluated and published between October 24, 1959 and March 5, 1960.*

Index

TO DRUGS EVALUATED IN THIS ISSUE

Index

TO EVALUATED DRUGS AND ARTICLES IN THE FEBRUARY, MARCH AND APRIL ISSUES OF THE AMERICAN JOURNAL OF HOSPITAL PHARMACY.

* A monograph on the "Parenteral Use of Triamcinolone Acetonide (Kenalog)" from the March 5 *A.M.A. Journal* will appear in June issue of This Journal.

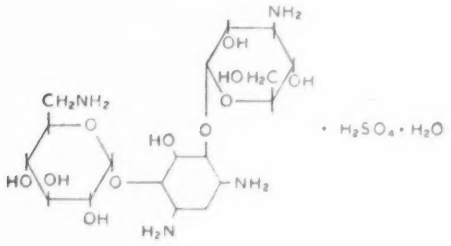
NEW AND NONOFFICIAL DRUGS

The following descriptions of drugs are based upon available evidence and do not in any case imply endorsement by the Council.

H. D. KAUTZ, M.D., *Secretary*

Kanamycin Sulfate — Kantrex®

KANAMYCIN SULFATE (Kantrex) is the sulfate salt of an antibiotic substance derived from strains of Streptomyces kanamyceticus.—Kanamycin is a thermostable, water-soluble, polybasic substance. Its chemical structure consists of two amino sugars glycosidically linked to deoxystreptamine. The chemical structure of kanamycin sulfate may be represented as follows:



Actions and Uses

The in vitro antibacterial activity of kanamycin is almost identical with that of neomycin. Kanamycin is active against many aerobic gram-postitive and gram-negative bacteria, including most of the strains of staphylococci so far isolated from clinical sources. Gram-negative organisms sensitive to kanamycin include species of Klebsiella, Aerobacter, Shigella, Salmonella, Neisseria, Escherichia coli, and the majority of strains of Proteus. It is active against mycobacteria. Common gram-positive pathogens such as streptococci and pneumococci are usually resistant to kanamycin at concentrations attainable in body fluids. Enterococci, Brucella, and Pseudomonas organisms are generally resistant as are clostridia, bacteroides, yeasts, and fungi. It is recommended that clinical therapy with kanamycin be guided by in vitro antibiotic sensitivity tests whenever possible.

The development of bacterial resistance to kanamycin can be demonstrated in vitro and in vivo against most sensitive organisms so far tested. There is almost complete cross resistance of organisms to neomycin and kanamycin and one-way cross resistance between streptomycin and kanamycin, i. e., organisms made resistant to kanamycin are resistant to streptomycin, but organisms made resistant to streptomycin are sensitive to kanamycin. In the case of the mycobacteria, cross resistance does not exist between kanamycin and streptomycin. Mycobacteria exhibit similar one-way cross resistance between viomycin and kanamycin. Kanamycin probably is bactericidal against most of the sensitive organisms; it is more active under aerobic than anaerobic conditions. The mechanism of action has not been fully elucidated. Against mycobacteria, kanamycin is bacteriostatic rather than bactericidal; mycobacteria develop resistance as rapidly as with streptomycin. Bacterial resistance can be induced among sensitive staphylococci, but it occurs in a slow, step-wise fashion as is the case with penicillin.

Kanamycin is absorbed rapidly from intramuscular sites but only slightly absorbed from the gastrointestinal tract. Hence, kanamycin must be used parenterally for systemic infections. After intramuscular injection, the drug is absorbed rapidly, inducing peak serum concentrations within one hour after injection. Blood levels from recommended doses are maintained for 8 to 12 hours. Kanamycin does not cross the blood-brain barrier in persons without meningeal infection at doses so far used, but it may reach significant concentration if the meninges are inflamed. Kanamycin appears in pleural, peritoneal, and synovial fluids after intramuscular injection.

Kanamycin is not recommended in minor or self-limited infections and should be used cautiously in the presence of renal impairment because of the increased risk of ototoxicity in such patients; in moderately severe or severe infections which are about equally susceptible to more than one antimicrobial agent, including kanamycin, the choice of therapy should be determined on the basis of relative potentiality for inducing serious toxic effects. Because of the lack of cross resistance between kanamycin, penicillin, streptomycin, chloramphenicol, novobiocin, oleandomycin, and the tetracyclines, kanamycin may be useful in infections which have failed to respond to those antibiotics. There appears to be no doubt that kanamycin has been lifesaving in those instances in which organismal resistance precludes the use of other antimicrobials.

Parenteral therapy with kanamycin has been successfully used in patients with staphylococcic and gram-negative infections of the respiratory tract, soft tissues, and the urinary tract as well as in osteomyelitis, septicemia, and bacteremia. Kanamycin may be given orally for infections of the gastrointestinal tract due to sensitive organisms, particularly Salmonella and Shigella; severe infections may require supplemental parenteral therapy. Kanamycin may be used for preoperative preparation of the large intestine in the same manner as neomycin. It has also been used orally to destroy nitrogen-producing bacteria as a means of reducing blood ammonia levels in cirrhotic patients suffering from hepatic coma. Limited clinical experience indicates that kanamycin given orally may be effective in eliminating cysts of Entamoeba histolytica from the stools of asymptomatic carriers.

Kanamycin has been given in a 2.5 percent concentration by intraperitoneal instillation after exploration for established peritonitis or after contamination due to fecal spill during surgery. The usefulness of this procedure is not established because of the danger of respiratory paralysis when the patient is still under the effects of anesthetics or muscle relaxants and because of the possibility of renal damage if the patient goes into shock. The drug has also been used as an irrigating solution (0.25 percent) in abscess cavities, in the pleural space, and in the peritoneal and ventricular cavities.

Kanamycin is not now recommended for the treatment of tuberculosis. However, clinical investigation programs are in progress, which should point out the proper place of kanamycin in therapy of tuberculosis.

Limited clinical studies indicate that kanamycin is effective in cutaneous anthrax and in acute gonorrhea in the male, but it is not recommended for these infections because less toxic antimicrobials are equally effective.

Toxicity and Side-Effects

The major toxic effect of parenterally administered kanamycin is its action on the auditory portion of the eighth nerve. This effect seems to be related to the height and duration of serum concentrations of kanamycin. For this reason, the recommended daily dose of 15 mg. per kilogram of body weight should not be exceeded except in rare instances, nor should the duration of therapy be prolonged unnecessarily. Ototoxic reactions are much less frequent in well-hydrated patients under 45 years of age with normal kidney function who receive less than 20 Gm. of kanamycin in 10 to 14 days and who have not previously received streptomycin, dihydrostreptomycin, or neomycin. The drug should be used with extreme caution and in considerably reduced dosage in patients with impaired renal function, since delayed excretion of the drug induces unnecessarily high serum levels and sharply increases the risk of ototoxicity. The risk of ototoxicity is also greater in patients beyond middle age. Deafness can be either partial or complete and, in most cases, has been irreversible.

Hearing loss is sometimes preceded by tinnitus or dizziness. If these symptoms occur, the drug should be withdrawn immediately. In patients with impaired renal function, hearing loss and even total deafness has occurred two to seven days after the drug has been withdrawn. This appears to be due to the maintenance of high serum levels because of failure of excretory mechanisms. If kanamycin is to be used in the treatment of infections in patients who have renal impairment, the daily dosage should be reduced by as much as one-quarter or one-half the total daily dosage. If possible, the patient's hearing should be checked with the audiometer before and during treatment, and kanamycin therapy should be stopped if there is loss of high frequency response.

Evidence of renal irritation (casts, albumin, and microscopic hematuria) frequently occurs during parenteral therapy with kanamycin. This seems to be associated with the rapid excretion of the drug by glomerular filtration and selective reabsorption of water (but not of kanamycin) in the tubules. These effects appear to be reversible on cessation of therapy and are not indications for withdrawing kanamycin if the patient's infection is responding. In some patients with concurrent renal failure, particularly those suffering from intercapillary glomerulosclerosis (Kimmelstiel-Wilson syndrome), kanamycin may be nephrotoxic. Increasing elevation of the blood urea nitrogen level or the appearance of oliguria are indications for stopping kanamycin therapy.

Some local irritation or pain may follow intramuscular injection, but this has rarely interfered with continued therapy. Eosinophilia has been noted. Among the minor side-effects to the drug are rare instances of sensitization, skin rash, drug fever, headache, and paresthesia. Neither hematopoietic nor hepatic toxicity has been noted, either in animal studies or during clinical use.

Because of its slight absorption from the gastrointestinal tract, oral administration is generally well tolerated and without significant side-effects. The possibility of absorption of kanamycin from ulcerated intestinal lesions or retention due to shock or renal damage should be borne in mind, but ototoxicity after oral administration is unlikely and has not been reported.

Dosage

Kanamycin sulfate is given by intramuscular injection, but it also may be administered intravenously for systemic effect. For local or topical effect, kanamycin may be administered orally, intraperitoneally, by inhalation as an aerosol, and by intracavitary instillation. Dosage is expressed in terms of the free base. Patients receiving systemic kanamycin therapy should be well hydrated.

For intramuscular administration in adults and children, the daily dosage should not exceed 15 mg. per kilogram of body weight given in two or three divided doses. If infection is not controlled within five days, the clinical picture should be reevaluated.

The intravenous injection of kanamycin sulfate is recommended only for gravely ill patients with overwhelming infections or with impending vascular collapse. When indicated, a 0.25 percent solution (2.5 mg. per cubic centimeter) is prepared and administered by slow intravenous infusion at a rate of 3 to 4 cc. per minute. The dosage for adults and children is 15 to 30 mg. per kilogram of body weight per day given in two or three divided doses.

For intraperitoneal use after surgery in patients with peritonitis or fecal contamination of the peritoneum, 2.5 percent solutions (500 mg. of kanamycin in 20 cc. of water for injection) have been instilled through a polyethylene catheter sutured into the wound at closure.

For inhalation (aerosol) therapy in patients with respiratory tract infections, a solution containing 250 mg. in 1 cc. is diluted with 3 cc. of sodium chloride injection and nebulized.

For intracavitary use, a 0.25 percent irrigating solution (2.5 mg. per cubic centimeter) has been instilled in abscess cavities, pleural space, and peritoneal and ventricular cavities. Small amounts should be used; the volume given intrathecally or into the ventricles should probably not exceed 5 cc.

For preoperative preparation of the large intestine, kanamycin is given orally in doses of 1 Gm. every hour for four hours, then 1 Gm. every six hours for 36 to 72 hours before surgery. For oral use in the treatment of Shigella and Salmonella infections, total daily dosage has ranged from 15 to 30 mg. per kilogram of body weight. In amebiasis, oral dosage has ranged from 30 to 150 mg. per kilogram of body weight per day given in divided doses for 10 days.

It must be emphasized that kanamycin should be given orally for the purpose of obtaining antibacterial effects within the intestine; it should not be given orally for systemic infections.

Preparations

Capsules 500 mg.; solution (injection) 500 mg. in 2 cc., 1 Gm. in 3 cc.

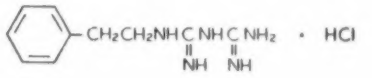
Year of introduction: 1958.

Bristol Laboratories Inc. cooperated by furnishing scientific data to aid in the evaluation of kanamycin sulfate.

J. Am. Med. Assoc. 172:699 (Feb. 13) 1960.

Phenformin Hydrochloride DBI®

PHENFORMIN HYDROCHLORIDE (DBI) is N^1-β-phenethylbiguanide hydrochloride.—The structural formula of phenformin hydrochloride may be represented as follows:



Actions and Uses

Phenformin hydrochloride is an orally effective hypoglycemic agent used in the management of diabetes mellitus. A biguanide derivative, it should not be confused with the distinctly different diguanidine compounds, some of which also have hypoglycemic activity but which may produce renal and hepatic damage. Nor is it related chemically to the sulfonylurea compounds, such as tolbutamide, or to insulin.

Phenformin hydrochloride may be used alone, in conjunction with insulin, or with other antidiabetic agents. It has a somewhat wider spectrum of usefulness than the sulfonylurea derivatives, but, like the latter, it is a much less potent hypoglycemic agent than is insulin; when used alone, it effects normoglycemia and eliminates glycosuria in only a portion of the patients in whom it is tried. The patients in whom it is most likely to be effective are those in whom the disease is stable, is of recent onset, began after the onset of maturity, requires only small doses of insulin, and has never been complicated by acidotic ketosis. In an additional group of patients whose symptoms cannot be satisfactorily controlled by administration of sulfonylurea or biguanide derivatives alone, the concomitant use of these two groups of oral agents may render supplemental insulin unnecessary. Finally, unlike the sulfonylurea compounds, it is also effective in a few cases of labile diabetes and of juvenile diabetes, although most patients in these groups will continue to require insulin.

Phenformin hydrochloride alone is only occasionally effective in diabetes requiring more than 40 units of insulin per day. It should not be used in diabetes that is controlled by diet alone, in juvenile diabetes that is well regulated

by insulin, in the management of diabetes during the early postoperative period, and in such complications of diabetes as acidosis, coma, and infection. In stable diabetes, phenformin hydrochloride offers an advantage over insulin only when it is effective alone, since little is gained by a mere reduction in the dose of insulin. In unstable diabetes, on the other hand, the conjunctive use of phenformin hydrochloride and insulin may be justified, since the concomitant use of the two drugs sometimes effects smoother regulation than the use of either alone.

That phenformin hydrochloride lowers blood sugar level and eliminates glycosuria in many patients is undeniable; whether it corrects the underlying defects in carbohydrate, fat, and nitrogen metabolism, however, is still unknown. Thus, it is somewhat disturbing that some patients in whom phenformin hydrochloride maintains a normal blood sugar concentration may experience loss of weight, weakness, and lassitude unless small doses of insulin are also administered. Too, the effects of phenformin hydrochloride on the vascular and other long-term sequelae of diabetes can be determined only after years of experience. For these reasons, patients receiving this relatively new drug must be most attentively observed for both acute and long-term complications.

Phenformin hydrochloride, like other oral hypoglycemic agents and like insulin, controls rather than cures diabetes mellitus. It does not obviate the need for complete education of the patient concerning his disease and its treatment. The importance of adherence to a carefully formulated diet and of the prevention and treatment of diabetic complications must still be stressed. All patients must be instructed in the use and injection of insulin, since this drug remains the indispensable agent for the treatment of the acute complications of diabetes mellitus.

Side-Effects

The usefulness of phenformin hydrochloride is limited by the frequency with which gastrointestinal symptoms such as anorexia, nausea, vomiting, and diarrhea occur. The incidence and severity of these symptoms are proportional to the dose. Although they occur in about 25 percent of patients receiving 150 mg. or more per day, an occasional patient may tolerate much larger doses. These and other minor side-effects are reversible and ordinarily disappear within 24 hours after the drug is withdrawn. Adverse effects on the liver, kidney, or hematopoietic tissues or other serious toxicity have not been reported.

Pharmacology

In therapeutic doses, phenformin hydrochloride has few effects other than its hypoglycemic action. Adrenal function, as measured by 17-ketosteroid and 17-hydroxycorticoid urinary excretion, is not altered; response to adrencorticotropic hormone remains unchanged. Nor does there appear to be any effect on thyroid function; although uptake of iodine by the thyroid may increase slightly in some patients, there is no alteration of serum protein-bound iodine or of cholesterol concentration. The blood concentrations of pyruvic acid and lactic acid may increase slightly in diabetic patients but usually remain unchanged when the drug is given to normal persons.

Phenformin hydrochloride is apparently absorbed satisfactorily from the gastrointestinal tract. Its time-action curve has not been described in detail in human beings, but experiments in animals suggest that it has a relatively brief duration of action, with the peak effect occurring three to five hours after administration of a single dose. The metabolic fate and routes of excretion of the drug are unknown.

Evidence concerning the mechanism of action of phenformin hydrochloride is conflicting. That insulin-secreting tissue is not necessary for its action is clear, since the drug lowers the blood sugar in depancreatized animals, although to a lesser degree than in the intact animal. The effect is also observed in the animal made diabetic by treatment with alloxan and in the hepatectomized animal. Phenformin hydrochloride does not lower the blood sugar level in nondiabetic man. The greater part of the present evidence suggests that its most important action is to increase the rate of anaerobic metabolism of glucose. There is some evidence that a decrease in gluconeogenesis and an increase in the oxidation of glucose via the hexose monophosphate shunt may also occur. Although phenformin hydrochloride, like many other drugs, inhibits the degradation of insulin in vitro, it seems unlikely that this action contributes significantly to its effects in vivo.

Dosage

Phenformin hydrochloride is administered orally. As with any agent used in the management of diabetes, the dose must be adjusted to meet the needs of the individual patient. The drug may be given with meals in an attempt to minimize gastrointestinal side-effects, although there is no evidence that these effects are due to local irritation. Two or three doses a day will produce satisfactory results in many patients, but four doses a day will often afford smoother regulation of the blood sugar level. The dose should be low initially and increased gradually. Although there is no contraindication to the use of larger doses in patients who require and tolerate them, the incidence of gastrointestinal side-effects is quite high when the total daily dose exceeds 150 mg. It should be remembered that, with a given dosage schedule, significant hypoglycemic response may not be apparent until after a period of three days or more.

Hospitalization facilitates proper dosage adjustment. The effect on blood sugar level, urine sugar level, and ketone bodies must be carefully observed. Should signs of acidotic ketosis, impending coma, or other complications appear, the insulin dosage must be immediately increased and other appropriate therapeutic measures instituted.

In diabetics who have never received insulin, but in whom the disease cannot be satisfactorily controlled by diet alone, phenformin may be started in initial doses of 25 mg. twice daily. If the response is not satisfactory, the daily dose is increased by increments of 25 mg. at intervals of three or four days.

In patients who are receiving insulin, the dose of phenformin hydrochloride is gradually increased as the dose of insulin is reduced. The dose of phenformin hydrochloride that will be needed cannot be predicted from the insulin requirement. In all cases, the initial dose of phenformin hydrochloride is 25 mg. twice a day; again, the total daily dose is increased in increments of 25 mg. at intervals of three or more days, as required. In adults with stable diabetes, who require less than 30 units of insulin per day, the insulin may be withdrawn at once, or, if preferred, the dose may be reduced gradually; if the daily insulin requirement exceeds 30 units per day, however, the insulin dose should not be reduced by more than 25 percent at one time.

In labile or juvenile diabetes, usual doses of insulin are continued for several days after treatment is begun. The dose of insulin is then reduced very slowly; each reduction should not exceed 10 percent. In these cases, complete withdrawal of insulin is ordinarily impossible, so that the usual objective is smoother regulation than is possible with the use of insulin alone.

Preparations

Tablets 25 mg.

Year of introduction: 1959.

U. S. Vitamin & Pharmaceutical Corporation, Division of Arlington-Funk Laboratories, cooperated by furnishing scientific data to aid in the evaluation of phenformin hydrochloride.

J. Am. Med. Assoc. 172:702 (Feb. 13) 1960

Streptokinase-Streptodornase (Varidase)

Buccal and Intramuscular Use of

The Council has reviewed the available evidence pertaining to the usefulness of buccally or intramuscularly administered streptokinase-streptodornase for the treatment of edema associated with inflammation or infection. (For a description of topical or intracavitary therapy with this enzyme preparation in the management of suppurative conditions in which infection or purulent exudation is present, see the monograph on streptokinase-streptodornase in New and Nonofficial Drugs.) It is postulated that the beneficial effects of buccally and intramuscularly administered streptokinase-streptodornase are due to the streptokinase component of the mixture and are explained by the ability of this enzyme to liquefy fibrin thrombi through activation of plasmin in blood and lymphatic channels and by lessening the viscosity of edema fluid. It is claimed that streptokinase permits easier access of the humoral forces of the host and concomitantly administered antibiotics to the area of infection. Although this may be theoretically plausible, the experimental observations in animals are incapable of establishing such a mode of action.

Among the conditions for which streptokinase-streptodornase may prove useful are those that may be associated with acute inflammatory processes, such as thrombophlebitis; cellulitis; abscess; sinusitis; arteriosclerotic, varicose, and stasis ulcers; hematoma; contusions; the congestion associated with bronchitis and bronchiectasis; sprains; fractures; dental surgical procedures, and any form of trauma. Clinical experience with buccally or intramuscularly administered streptokinase-streptodornase has been extensive, and many favorable results have been reported. Relief of pain, quicker resolution of edema, and more rapid subsidence of infection are said to follow its use. However, few of the studies have been well controlled. This seriously hampers a precise evaluation of the drug. Due to the variable course (with or without treatment) of the conditions for which streptokinase is proposed, it is difficult to assess, in the absence of carefully controlled studies, what part in the over-all improvement of the patient may be ascribed to the drug. In patients with edema associated with infection, streptokinase-streptodornase should be administered concomitantly with antibiotics. Comparative observations, with placebo medication substituted for the enzymes, would be difficult to carry out. However, in the absence of such studies, it is not possible to determine whether enzyme therapy was a contributing factor in the accelerated improvement of the patients. Clinical observations would tend to support the conclusion that the adjunctive use of streptokinase-streptodornase by either the buccal or intramuscular routes has a useful place in the management of inflammatory edema, with or without infection. The evidence presented to support this conclusion does not, however, withstand critical scrutiny. Accordingly, in the judgment of the Council, the usefulness of the drug by these routes of administration is unestablished.

When administered by the buccal route, streptokinase-streptodornase is well tolerated. Side-effects have been limited to urticaria, skin rashes, and rare instances of local irritation and dryness at the site of tablet disintegration. When the drug is given intramuscularly, pain at the site of injection has been observed in many patients. Febrile reactions have also followed its parenteral injection; as with any parenterally administered foreign protein, there is a theoretical risk of serious allergic reactions. By either route, caution is advised when there is evidence of a defect in blood coagulation or impairment of liver function.

For buccal use, a tablet containing 10,000 units of streptokinase is placed in the buccal pouch or under the tongue and allowed to dissolve slowly. The usual dose is one tablet four times daily. The tablets should not be chewed or swallowed whole. For intramuscular use, a solution is prepared from the streptokinase-streptodornase mixture which provides 10,000 units of streptokinase per cubic centimeter. The proposed dose is 0.5 cc. (5,000 units of streptokinase) injected twice daily in the gluteal region. Although the evidence that streptokinase-streptodornase exerts a beneficial effect is inconclusive, the foregoing doses may be regarded as a base line or guide.

The Council voted to expand the monograph in New and Nonofficial Drugs to describe the buccal and intramuscular use of streptokinase-streptodornase, with caution as to the experimental status of these routes of administration.

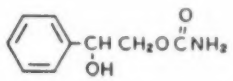
Lederle Laboratories Division, American Cyanamid Company, cooperated by furnishing scientific data to aid in the evaluation of the buccal and intramuscular use of streptokinase-streptodornase.

J. Am. Med. Assoc. 172:701 (Feb. 13) 1960

Styramate

Sinaxar®

STYRAMATE (Sinaxar) is 2-hydroxy-2-phenylethyl carbamate.—The structural formula of styramate may be represented as follows:



Actions and Uses

Styramate displays a pattern of pharmacological activity in animals similar to that of mephenesin and other centrally acting skeletal muscle relaxants. Thus, experimental observations indicate that it is a central nervous system depressant with relative specificity in depressing polysynaptic spinal reflexes; it antagonizes convulsions induced either by drugs or by electroshock. After oral administration, the duration of action of styramate seems to be two or three times that of mephenesin. In animals, toxic doses produce decreased motor activity, ataxia, loss of the righting reflex, and paralysis. Chronic toxicity studies have revealed no adverse effects on the liver, kidney, or blood-forming tissues.

Of the reported clinical trials of styramate, few have incorporated comparisons with other muscle relaxants or with placebos. The present assessment of the efficacy of the drug must, therefore, be regarded as tentative. However, although much more experience or more carefully designed clinical investigation will be required to establish the value of styramate, the limited available evidence indicates that it may be helpful in relieving muscle spasm associated with a variety of clinical conditions, including myositis, fibrositis, arthritis, spondylitis, acute lumbosacral strain, and torticollis. It should be considered an adjunct to physiotherapy and other appropriate measures. The drug is not claimed to be effective in paralysis agitans.

Although drowsiness, vertigo, headache, and urticarial eruption have been reported after administration of styramate, the incidence of these side effects was low, and their occurrence cannot be definitely ascribed to the use of the drug. Patients should be cautioned concerning a possible sedative effect, however.

Dosage

Styramate is administered orally. The dose is adjusted in accordance with the needs and tolerance of the individual patient. Although larger doses have been used, 200 mg. four times daily should be tried initially. If the response is unsatisfactory, the dose may be gradually increased, as required, until a total daily dosage of 1.6 Gm. is reached, unless untoward effects supervene.

Preparations

Tablets 200 mg.

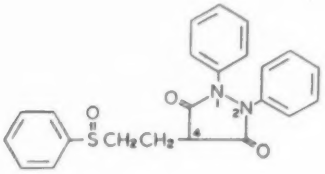
Year of introduction: 1958.

Armour Pharmaceutical Company, Division of Armour and Company, cooperated by furnishing scientific data to aid in the evaluation of styramate.

J. Am. Med. Assoc. 172:698 (Feb. 13) 1960.

Sulfinpyrazone — Anturan®

SULFINPYRAZONE (Anturan) is 1,2-diphenyl-4-(2'-phenylsulfinethyl)-3,5-pyrazolidinedione.—The structural formula of sulfinpyrazone may be represented as follows:



Actions and Uses

Sulfinpyrazone, a pyrazolone derivative chemically related to phenylbutazone, is a potent uricosuric agent employed in the management of gout. It is useful primarily in the prevention, rather than the treatment, of attacks of acute gouty arthritis. The severity and frequency of such attacks are reduced by continuous long-term administration of the drug, presumably by virtue of its ability to promote the renal excretion of uric acid. The maximal increase in uric acid excretion obtainable with sulfinpyrazone is comparable to that with probenecid, whereas the dose required for equivalent effects is smaller. Nevertheless, although most patients experience some reduction in the serum uric acid concentration, normal values cannot be achieved in all patients. Patients refractory to other uricosuric agents may respond to sulfinpyrazone.

In chronic gout, sulfinpyrazone suppresses formation of new tophi and many reduce the size of old tophaceous deposits and alleviate joint pain and stiffness. However, improvement usually becomes apparent only after several weeks or months of treatment. Most patients require the concomitant use of colchicine or of other drugs for adequate symptomatic relief, since sulfinpyrazone has only weak, if any, analgesic or anti-inflammatory action. For similar reasons, colchicine, phenylbutazone, and other analgesics are not replaced for the relief of pain and the other manifestations of acute gout.

Sulfinpyrazone is rapidly and completely absorbed from the gastrointestinal tract; about one-half of a single dose is excreted or metabolized within three hours. Experimental studies reveal that sulfinpyrazone increases the renal clearance of uric acid, depresses clearance of para-aminohippuric acid, and has little effect on the clearance of inulin. These observations suggest that, like probenecid, it produces its uricosuric effect by preventing tubular reabsorption of uric acid, without altering the rate of glomerular filtration.

Salicylates, which even in small doses strongly antagonize its uricosuric action, should not be administered with sulfinpyrazone. There is no known contraindication to the conjunctive use of phenylbutazone, probenecid, or zoxazolamine with sulfinpyrazone, however.

Side-Effects

An acute attack of gouty arthritis is sometimes precipitated shortly after treatment with sulfinpyrazone is begun, and the frequency of acute attacks may be increased for several weeks thereafter. For this reason, the prophylactic administration of colchicine during the first few weeks of treatment has been recommended.

The marked increase in urate excretion induced by sulfinpyrazone sometimes provokes urolithiasis and renal colic. In order to minimize the incidence of this complication, eradication of preexisting urinary tract infections and administration of sufficient fluid and alkali to insure a large volume of alkaline urine are indicated. The drug should be used only with great caution, if at all, in patients with impaired renal function; in such cases, periodic tests of renal function should be performed.

Epigastric distress and other gastrointestinal symptoms are among the most frequent complications of treatment with sulfinpyrazone; activation of quiescent peptic ulcer has been reported. Hence, it is suggested that sulfinpyrazone be administered with food, milk, or alkali. The drug is contraindicated in patients who have, or who have recently had, an active peptic ulcer.

Leukopenia and thrombocytopenia have each been reported in a single patient taking the drug. In neither instance, however, was the effect definitely ascribable to the drug. Nevertheless, because of the known propensity of a number of other pyrazolone derivatives to depress hematopoietic function, all patients receiving sulfinpyrazone should have blood cell counts done at regular intervals. Experience with this agent has been relatively limited, and it is not yet possible to estimate the hazard of more serious toxic effects, such as those of the parent compound phenylbutazone, when sulfinpyrazone is given over protracted periods.

Dosage

Sulfinpyrazone is administered orally, preferably with meals or with milk. The dose is 50 mg. four times daily, initially, and is gradually increased over a period of a week, until a total daily dosage of 400 to 800 mg. is reached. After a satisfactory reduction of the blood urate level has been achieved, somewhat lower doses, adjusted in accordance with the requirements of the individual patient, are often sufficient for maintenance. Treatment should be continued without interruption. Acute exacerbations of gout do not necessitate discontinuance, but, as previously mentioned, may require the concomitant use of colchicine, phenylbutazone, or other drugs.

Preparations

Tablets 100 mg.

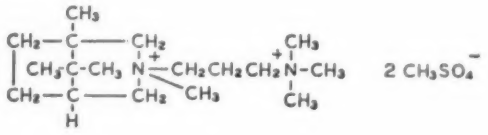
Year of introduction: 1959.

Geigy Pharmaceuticals, Division of Geigy Chemical Corporation, cooperated by furnishing scientific data to aid in the evaluation of sulfinpyrazone.

J.Am.Med.Assoc. 172:1038 (Mar. 5) 1960.

Trimethidinium Methosulfate — Ostensin®

TRIMETHIDINIUM METHOSULFATE (Ostensin) is *d*-[N-methyl-N-(γ-trimethylammoniumpropyl)]-1-methyl-8,8-dimethyl-3-azabicyclo[3.2.1]octane dimethosulfate.—The structural formula of trimethidinium methosulfate may be represented as follows:



Actions and Uses

Trimethidinium methosulfate, a quaternary ammonium compound, is used in the treatment of hypertension. The principal pharmacological effects of the drug are referable to autonomic ganglionic blockade. In addition, trimethidinium also exerts some degree of centrally mediated activity. In terms of weight of drug required to produce comparable reductions in blood pressure, trimethidinium is more potent than hexamethonium but less than mecamylamine. Its duration of action lasts about 7 to 12 hours after oral administration. The absorption of orally administered trimethidinium methosulfate is not complete, but it is reasonably regular and predictable when given to patients in a fasting or near-fasting state.

The clinical use of trimethidinium should be restricted to those patients with moderate to severe forms of diastolic hypertension who fail to respond adequately to therapy less drastic than ganglionic blockade. Ganglionic blocking agents should not be given for mild, labile hypertension. When indicated, orally administered trimethidinium will usually lower both systolic and diastolic blood pressure. The adjunctive use

of chlorothiazide or reserpine may afford additional symptomatic relief and allow for reduction in the daily dose of trimethidinium. Tolerance to trimethidinium may occasionally develop after a stage of initial sensitivity; in such cases, however, if therapy is continued and the dose gradually increased, usually an antihypertensive effect can again be produced. Secondary tolerance has not been reported.

Therapy with trimethidinium should be undertaken cautiously, with the realization that the drug is capable of producing the full spectrum of pharmacological side-effects referable to ganglionic blockade. These include blurring of vision, postural hypotension, dryness of the mouth, constipation, interference with sex functions, weakness, nervousness, malaise, dizziness, and headache. Present evidence indicates that trimethidinium causes visual disturbances more often than do mecamylamine or hexamethonium. It shows a lower incidence and severity of certain other side-effects, such as constipation and paralytic ileus, common to other ganglionic blocking agents. The drug should be administered cautiously, if at all, in the presence of marked renal insufficiency, especially when there is elevation of blood nonprotein nitrogen levels. Patients with coronary insufficiency, recent myocardial infarction, cerebral thrombosis, and severe, generalized atherosclerosis should not be treated by ganglionic blockade. Other contraindications to the drug include glaucoma, organic pyloric stenosis, bleeding peptic ulcer, and uremia.

Dosage

Trimethidinium methosulfate is administered orally. Dosage must be highly individualized according to the response of the particular patient and the appearance and severity of side-effects.

Oral therapy is initiated by the administration of 20 mg. before breakfast and again before the evening meal. Dosage is then increased by increments of 20 mg. every third day until a satisfactory response is obtained. The ultimate total daily dose may vary from 20 to 480 mg.

Preparations

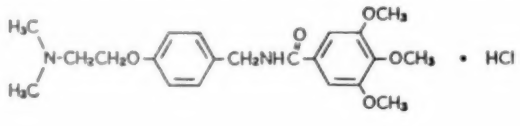
Tablets 20 mg. and 40 mg.

Year of introduction: 1959.
Wyeth Laboratories, Division of American Home Products Corporation, cooperated by furnishing scientific data to aid in the evaluation of trimethidinium methosulfate.
J.Am.Med.Assoc. 172:1039 **(Mar. 5) 1960.**

Trimethobenzamide Hydrochloride

Tigan® Hydrochloride

TRIMETHOBENZAMIDE HYDROCHLORIDE (Tigan Hydrochloride) is N-(dimethylaminoethoxybenzyl)-3,4,5-trimethoxybenzamide hydrochloride.—The structural formula of trimethobenzamide hydrochloride may be represented as follows:



Actions and Uses

Trimethobenzamide hydrochloride, proposed for use as an antiemetic agent, is reported to be helpful in alleviating nausea and reducing the frequency of vomiting in the immediate postoperative period; in pregnancy; in motion sickness; in intoxication from digitalis, nitrogen mustard, and other drugs; and in such pathological conditions as malignancy, hepatitis, cholecystitis, uremia, alcoholic gastritis, labyrinthine disease, and radiation sickness. Although the early clinical reports are favorable, many are based on uncontrolled trials in which no comparisons with placebos or with other similar drugs were made, and the results obtained are difficult to appraise accurately. Nevertheless, the few comparative studies thus far reported suggest that trimethobenzamide hydrochloride has significant antiemetic activity. Effects appear within 20 to 40 minutes after either oral or intramuscular administration and persist for three to four hours.

Side-Effects

No evidence of serious toxicity has accompanied the use of trimethobenzamide hydrochloride; adverse effects on the liver, kidney, or bone marrow have not been noted. However, most studies have been short-term trials, and further studies are greatly needed to establish definitely the safety of the drug for long-term use. Although the incidence of minor side-effects is not high, drowsiness, vertigo, diarrhea, exaggeration of preexisting nausea, pain at the site of injection, and local irritation after rectal administration have been reported. Administration prior to or during anesthesia apparently does not prolong awakening time. A sudden fall in blood pressure has been observed in one patient shortly after an injection of trimethobenzamide hydrochloride given during the postoperative period; however, it is questionable whether this complication was due to the action of the drug.

Experimental Pharmacology

In animals, trimethobenzamide hydrochloride effectively inhibits apomorphine-induced vomiting, and is thus presumed to act primarily by depressing the chemoreceptor trigger zone; the possibility that depression of the medullary vomiting center may also contribute to its antiemetic effect has not been excluded, however. The antiemetic potency of trimethobenzamide hydrochloride is about one-tenth that of chlorpromazine when given subcutaneously and one-fourth that of the latter when given orally. When equieffective antiemetic doses of the two agents are compared, trimethobenzamide hydrochloride is the less active depressant of the central nervous system, as measured by degree of sedation, modification of behavior, prolongation of barbiturate sleeping time, and changes in the electroencephalogram.

Although trimethobenzamide resembles diphenhydramine and several other histamine-antagonizing agents in being an ether of dimethylaminoethanol, it seems to have only weak antihistaminic activity. Nor does it appear to antagonize the effects of epinephrine or of acetylcholine. An intravenous injection, in animals, produces a fall in blood pressure and an increase in bronchial tone.

Dosage

Trimethobenzamide hydrochloride is administered orally, rectally, or intramuscularly. In adults, the recommended dose is 100 to 300 mg. given orally or intramuscularly four times daily. However, the effects of the larger doses within this range, when administered over prolonged periods, have not been thoroughly explored. When given rectally, the dose is 200 mg. For the prevention of postoperative vomiting, a single dose of 200 mg. is given intramuscularly prior to or during surgery; this dose may be repeated three hours after the termination of anesthesia, if necessary.

In children, the aforementioned doses are reduced, in proportion to their body weight. For the prevention of postanesthetic vomiting, the following single doses are given intramuscularly: in children weighing less than 30 lb. (13.6 kg.), 50 mg.; in those weighing 30 to 60 lb. (27.2 kg.), 100 mg.; 60 to 90 lb. (40.9 kg.), 150 mg.; and over 90 lb., 200 mg.

Preparations

Capsules 100 mg.; Solution (injection) 200 mg. in 2 cc.; Suppositories 200 mg.

Year of introduction: 1959.
Roche Laboratories, Division of Hoffmann-LaRoche, Inc., cooperated by furnishing scientific data to aid in the evaluation of trimethobenzamide hydrochloride.
J.Am.Med.Assoc. 172:1040 **(Mar. 5) 1960.**

The Council has authorized publication of the following report.
H. D. KAUTZ, M.D., *Secretary.*

CURRENT STATUS OF THERAPY IN MICROBIAL FOOD POISONING

G. M. DACK, M.D., Chicago

► MICROBIAL FOOD POISONING is frequently associated with acute illness of short duration. When the physician arrives in response to a telephone call, convalescence may be well under way. Because of the transient nature of the illnesses and the tendency for rapid convalescence, the general practitioner usually has had little opportunity to study them.

Microbial food poisoning falls into two principal categories. The first is one in which the causative microbes grow in a food and elaborate an exotoxin, for example, botulism and staphylococcus food poisoning. The second is one in which the causative living organisms multiply in a food product, and large numbers are required to produce infection. Examples of this group are Salmonella infections and food poisoning from certain streptococci, and from Bacillus cereus and Clostridium perfringens. Many of the viral and infectious agents may be disseminated in foods, but only those associated with gastrointestinal upsets are considered under the loose terminology "food poisoning."

In order for the physician to prescribe treatment, it is important that he have some idea as to the type of agent causing the illness. Implicated food may suggest the causative agent. However, before the implicated food has been determined, the symptoms, together with the period of their onset after a specific meal, are useful in directing attention to the causative agents. As an aid in finding the causative agent, the table gives the essential features of the various types of microbial food poisoning.

Botulism

Outbreaks of botulism are rare, and many types of illness have been confused with this disease, e. g., poisoning from pesticides such as sodium fluoride, methyl chloride poisoning, as well as cases of septic meningitis. In the United States the majority of outbreaks of botulism are related to the consumption of inadequately processed home-canned vegetables of low-acid content such as string beans, beets, and other vegetables. Usually there is evidence of spoilage by off-odors or flavors of such foods which are not a particularly good medium for the growth of Clostridium botulinum. Growth of the common types A and B of Cl. botulinum in meat products is accompanied by gross evidence of putrefaction, and for that reason such products are usually not eaten. In some homes, spoiled canned foods are given to chickens which develop limberneck and die. Such illness in poultry has sometimes provided the physician with useful clues leading to the diagnosis of botulism.

Five types of Cl. botulinum, labeled A, B, C, D, and E, are recognized. The types have certain biochemical reactions which differ, but their toxins cause the same kind of symptoms in man.

The mode of action of botulinum toxin in the body is not fully understood. However, the toxin appears to interfere with the production of acetylcholine, since a muscle in a physiological preparation poisoned by botulinum toxin will contract when acetylcholine is injected intra-arterially. A muscle in a similar preparation poisoned by curare does not react when treated with acetylcholine. Small amounts of either type A or type B toxin decrease the synthesis of acetylcholine in both in vivo and in vitro experiments. Some investigators have suggested an interaction of toxin, with the fine unmyelinated nerve fibers entering the end-plate region, thus causing a block of the nerve impulses. When the mechanism of the mode of action of botulinum toxin is discovered, perhaps a better treatment of the disease will be forthcoming. Until such a time, the only specific treatment is administration of antitoxin of the type causing the illness.

Each of the toxins is neutralized by a specific antitoxin. The most common types affecting man are A and B; type E less commonly, and types C and D have been rarely reported. Type E has been associated with fish or roe which has undergone spoilage. The treatment of botulism is, at best, unsatisfactory, and the mortality in the United States is about 65%. If a physician finds patients with symptoms suggesting botulism, it is advisable to determine whether low-acid, home-canned foods have been consumed from one to three days previously. When symptoms are well advanced, antitoxin therapy is of little value. However, antitoxin will prevent damage by the toxin which is not already fixed in the central nervous system. At least 50,000 units of each of type A and B botulinum antitoxin should be given intramuscularly after the patient has been tested for hypersensitivity, and, if necessary, has been desensitized. At least 10,000 units diluted in 5 or 10% dextrose injection may be administered intravenously every 18 to 24 hours.

Enemas are recommended for washing out the colon to eliminate toxin which might be retained because of constipation. The physician should attempt to prevent aspiration pneumonia. Fluids taken orally are avoided in pharyngeal weakness or paralysis. The secretions in the mouth and throat should be aspirated continuously with a soft rubber tube and an aspirating machine. Fluid and electrolyte balance are maintained with dextrose and sodium chloride injection given intravenously. Oxygen is administered for cyanosis, and artificial respiration may be required. There is no agreement among clinicians regarding the value of respirators in the treatment of botulism.

In the treatment of shock, whole blood and plasma should be given. Antibiotics and sulfonamides should be administered in appropriate amounts to prevent secondary infections. The patient should be kept in quiet, restful surroundings and encouraged to avoid unnecessary muscular exertion.

Patients who have eaten generously of the incriminated food develop symptoms of botulism early, and antitoxin does not repair damage already done to the tissues. Frequently, persons who have eaten less of the incriminated food may be treated with antitoxin before symptoms appear, and there is an excellent opportunity for them to benefit prophylactically from the administration of antitoxin. Antitoxin should always be administered, since it will unite with uncombined toxin and prevent its damaging the tissues.

Staphylococcic Food Poisoning

Staphylococcic food poisoning is the most common type encountered in the United States. Since staphylococci are ubiquitous, it is impossible to protect foods from them. Enterotoxin-producing strains causing acne and other pyogenic infections may be imparted to food through handling. Many apparently normal food handlers may carry food poisoning strains in their nose and throat. Staphylococci can withstand high concentrations of sugar and salt, and for that reason certain foods may serve as a selective medium for them. In order for an outbreak to occur, a food poisoning strain of staphylococcus is required, a food in which it will grow, plus time and correct temperature. With a generous seeding of the right type of staphylococcus, five to seven hours at a warm temperature is sufficient for enterotoxin to develop. The site of action of enterotoxin in the body has not been established. Enterotoxin may be produced in vivo when the organism is

Director, Food Research Institute and Professor of Microbiology, University of Chicago.

confined to pyogenic lesions in the body or in the intestinal tract, where the normal intestinal flora is abolished by the action of large doses of broad-spectrum antibiotics.

The short incubation period after a specific meal is characteristic of staphylococcic food poisoning. Especially is this so when a number of people develop similar symptoms after a common meal. The severity of the symptoms depends on the potency of the enterotoxin in the food consumed. When small amounts of enterotoxin were fed to human volunteers, some developed vomiting without diarrhea and others cramps and diarrhea without vomiting. With the smaller amounts, the time of appearance of symptoms after ingestion of enterotoxin was longer, varying from four to six hours. When large amounts of enterotoxin were fed to human volunteers, the time of appearance of symptoms was shortened (45 minutes to 2 hours). Nausea, vomiting, cramps, and diarrhea occurred in the severe cases, and blood was found in the vomitus and stools. Acute prostration was usually present in severe cases, and patients might experience a sharp fall in blood pressure and develop shock. Death, although rare, may follow in debilitated persons or in very young children.

Perphenazine (Trilafon) has been found to prevent vomiting in experimental animals which are later fed enterotoxin. It has not been evaluated in the treatment of staphylococcic food poisoning in man.

Since the vomiting and diarrhea are pronounced in staphylococcic food poisoning, there is no need to administer emetic or purgative drugs. Vomiting and diarrhea are nature's effective method for eliminating unabsorbed enterotoxin. Abdominal pain may be relieved by codeine sulfate (30 to 60 mg.) or morphine sulfate (10 to 15 mg). The most important therapeutic problem concerns dehydration and shock. Fluid balance should be restored by the intravenous administration of sodium chloride injection with 5% dextrose, 2,000 to 4,000 cc. in 24 hours. Patients adequately treated with fluids given parenterally recover quickly, and the period of convalescence is shortened. Caffeine sodium benzoate (500 mg. parenterally) may be required for severe prostration. Plasma and blood may be necessary therapeutic measures in the management of shock. Food or liquid by mouth is withheld until nausea and vomiting have stopped. Rice, clear broths, and tea may then be taken orally. Subsequently, the diet is enlarged gradually but limited temporarily to bland foods until the illness has subsided. Broad-spectrum antibiotics should not be given in the treatment of staphylococcic food poisoning, since many of the food poisoning strains of staphylococci are resistant to antibiotics. I am familiar with a patient who had a severe case of staphylococcic food poisoning and who was treated with large doses of chlortetracycline (Aureomycin) hydrochloride to which the causative staphylococcus was resistant. The patient developed a relapse of symptoms within 48 hours and died. Staphylococci ingested with incriminated food do not find conditions suitable for multiplication in the intestinal tract, since the normal microbial flora prevents their multiplication. Thus, it is important not to interfere with the normal microbial flora by the administration of broad-spectrum antibiotics.

Salmonella Infections

There are about 600 serotypes of Salmonella micro-organisms. Those concerned with the production of typhoid and paratyphoid fevers are not considered in this discussion. Approximately 40 types cause the majority of illnesses, which are food-borne and which give rise to infection lasting one or two days and commonly referred to as food poisoning. Some of these food poisoning strains invade the blood stream and cause infections lasting many days.

Salmonellae are abundant in nature and are found most commonly in the intestines of poultry and swine. They produce infection in animal species including cold blooded as well as warm blooded animals. They are present on the shell of eggs, and, when eggs are broken commercially, they find their way into frozen whole eggs, yolks, whites, and in dried egg products. These commercial egg products are used in the preparation of many food products including "convenience" foods, some of which are inadequately processed to destroy viable salmonellae.

Some students of enteric microbiology are under the impression that the incidence of salmonellosis is on the increase, as judged by the demand for serotyping of cultures; however, since there is no uniformity of reporting of these cases, there is no evidence to substantiate these impressions. Widespread outbreaks, due to specific unusual strains of Salmonella, have been reported which were thought to be related to food items in national distribution.

The predominant clinical picture is gastroenteritis, mostly mild in character, though a few cases may develop with typhoidal symptoms and fatalities among them. In one large outbreak in a city, there were 1,800 cases, with 11 fatalities due to Salmonella typhimurium. Complications are uncommon but include thrombosis, thrombophlebitis, pyelitis, osteomyelitis, dehydration and toxemia, arthritis, and, in young children, meningitis. Diarrhea may last for a few hours up to four to six days. Vomiting occurs occasionally.

The number of Salmonella organisms required to cause illness undoubtedly depends upon the age and susceptibility of the individual. Small numbers of organisms fed experimentally to some persons, although producing no illness, have sometimes resulted in a carrier state. From the public health standpoint it is desirable that no viable Salmonella, even in small numbers, be present in foods at the time they are eaten.

The treatment of Salmonella infections is largely symptomatic and is similar to that described for staphylococcic food poisoning. The intestinal tract is freed naturally of large numbers of Salmonella organisms by diarrhea, and only symptomatic treatment is needed.

Characteristics of Food Poisoning Caused by Bacteria or Their Products

Disease	Specific Agent	Intoxication	Infection	Symptoms	Onset of Symptoms after Eating	Foods Usually Involved
Botulism	Toxin of Clostridium botulinum	+	—	Difficulty in swallowing, double vision (diplopia), difficulty in speech (aphonia), difficulty in respiration, followed by death from paralysis of muscles of respiration	2 hr.-8 days; av., 1-2 days	Home-canned, low-acid products (toxin in food destroyed by boiling)
Staphylococcic food poisoning	Enterotoxin of staphylococci	+	—	Nausea, vomiting, diarrhea, acute prostration, abdominal cramps	1-6 hr.; av., 2½-3 hr.	Ham, cream-filled bakery goods, cheddar cheese, dry skim milk, poultry, potato salad (enterotoxin in food not destroyed by boiling)
Salmonella infection	About 600 serotypes of Salmonella, 40 of which are more common	—	+	Abdominal pain, diarrhea, chills, fever, frequent vomiting, prostration	7-72 hr.	Inadequately cooked egg products, poultry, or other foods
Streptococcic food poisoning	Enterococci	—	+	Nausea, sometimes vomiting, colicky pains, diarrhea	2-18 hr.; av., 8-12 hr.	Inadequately refrigerated foods contaminated with enterococci
Bacillus cereus food poisoning	Bacillus cereus	—	+			Starch foods inadequately refrigerated
Clostridium perfringens food poisoning	Clostridium perfringens	—	+			Poultry and meat products cooked and left unrefrigerated at warm temperature for several hours

Stool cultures should be made to determine whether Salmonella organisms are the cause of the illness. If symptoms of fever and toxemia are present for more than a day or if complications develop, a search should be made in the laboratory by sensitivity tests for an antibiotic to which the Salmonella strain is sensitive. No one antibiotic has been discovered to which all Salmonella strains are sensitive. In one large outbreak, oxytetracycline (Terramycin) hydrochloride, chlortetracycline hydrochloride and chloramphenicol (Chloromycetin) were used in treatment, with no appreciable benefit. In other instances Salmonella serotypes have responded to these and other antibiotics.

An antibiotic which is effective in vitro against a specific Salmonella strain should be administered to the patient in adequate dosage, with due precautions taken with reference to undesirable side-effects from the drug being administered.

Streptococcic Food Poisoning

Food poisoning caused by the alpha hemolytic streptococcus presents identical symptoms with that caused by B. cereus and Cl. perfringens, namely cramps and diarrhea, with only occasional vomiting, coming on usually 11 to 12 hours after eating a food item containing many millions of these organisms per gram. The incubation period may vary from 2 to 18 hours. There is usually no fever or leukocytosis, and the symptoms subside in the course of a few hours. No specific treatment is indicated, since the organisms do not establish themselves as a predominant flora in the intestinal tract. The mode of action of these agents in the production of illness has not been established.

When the streptococcus has been classified in several outbreaks, it has been found to be an enterococcus. This type of food poisoning has been studied in human volunteers, and, in many instances, has not resulted when large numbers of the enterococci have been fed. In other instances, illness has followed when freshly isolated cultures have been fed. More work is necessary to elucidate the mechanism by which illness results. Outbreaks have been associated with meat items and turkey dressing which have stood at warm temperatures for a number of hours, allowing profuse growth of enterococci.

Bacillus Cereus Food Poisoning

Outbreaks of food poisoning caused by B. cereus have been described in Norway. One large outbreak was traced to a ready-mix, vanilla pudding purchased from a grocery store, which was cooked and allowed to stand at a warm temperature until the following day when it was served. B. cereus is a spore-forming organism commonly found in the soil and therefore a natural contaminant of cereal products. The spores may not be destroyed in cooking and hence may germinate and grow rapidly in a food if conditions of moisture, time, and temperature are right. Illnesses have been produced in volunteers, but again more information is needed to determine the mechanism causing B. cereus food poisoning. No specific treatment is indicated since the symptoms are mild and of short duration. The diarrhea removes the organisms from the intestinal tract, and B. cereus fails to establish itself in the intestine.

Clostridium Perfringens Food Poisoning

Cl. perfringens has been found to cause many outbreaks of food poisoning in Great Britain. There is no doubt that many outbreaks occur in the United States, but seldom do laboratories examining implicated foods search for Cl. perfringens. The strains found to cause food poisoning produce extremely heat-resistant spores. Subcultures of strains from foods do not yield spores with the heat resistance of the original contaminants. The natural habitat of these strains is the intestinal tract of animals. Illnesses have been produced experimentally in human volunteers, particularly when the strain has been grown in a food which was involved in the outbreak. Negative tests among humans have occurred when old strains from outbreaks have been grown in common culture medium. The mechanism of the illness caused by Cl. perfringens is not understood. Outbreaks have commonly followed eating of meat products which have been cooked and allowed to stand at warm temperatures. In such instances the spores of Cl. perfringens contaminating the meat have not been destroyed but germinate and grow when the product is not refrigerated. No treatment is indicated for food poisoning from Cl. perfringens, since the symptoms are mild and the organism does not predominate in the intestine after the acute illness.

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POSITIONS

in hospital pharmacy

PERSONNEL PLACEMENT SERVICE

The Personnel Placement Service is operated without charge for the benefit of hospitals and pharmacist members of the American Pharmaceutical Association and the AMERICAN SOCIETY OF HOSPITAL PHARMACISTS. The ultimate purpose is the improvement of pharmaceutical services in hospitals, by more adequately fulfilling hospital pharmacy personnel needs and by locating positions which provide challenging opportunities for pharmacists who have indicated an interest in a hospital career.

By participating in the service, the hospital indicates a desire to achieve a pharmaceutical service which meets the *Minimum Standard for Pharmacies in Hospitals.* A description of the position should be submitted to the Division of Hospital Pharmacy on the forms provided. The hospital will receive applications directly from the applicant. The hospital agrees to reply to each application received and to notify the Division of Hospital Pharmacy when the position is filled.

The pharmacist, by participating, agrees to submit a Personnel Placement Service Information Form to the Division of Hospital Pharmacy. The applicant will then be notified of openings listed with the Service as they become available and can negotiate directly with the hospital if he is interested. It is agreed that the Division of Hospital Pharmacy will be notified as soon as a position is accepted.

A listing of positions open and wanted will be made regularly in the AMERICAN JOURNAL OF HOSPITAL PHARMACY without charge. Neither the name of the hospital offering the position nor the name of the applicant will be listed, except by code. All inquiries should be directed as shown above, including the code number.
Address all inquiries to

Division of Hospital Pharmacy
2215 Constitution Avenue, N. W.
Washington, 7, D. C.

positions open

CHIEF PHARMACIST—46 bed general hospital located on University campus in Washington State. Pharmacist will have charge of pharmacy dept. and will also be the clinical instructor in the College of Pharmacy. M. S. Degree desirable. Forty hour week, vacation, and sick leave. PO-200

STAFF PHARMACIST—280 bed general hospital. Intern and resident program, school of nursing and school of medical technology. Building program to include new pharmacy facilities. Must have B. S. in Pharmacy. Michigan registration required or be eligible for licensure. Recent graduate acceptable. Forty hour week, vacation, insurance, pension plan, holidays, and sick leave. PO-199

ASST. CHIEF PHARMACIST—517 bed hospital. General pharmacy duties. Liberal benefits. Must be registered in Ill. PO-198

ASST. CHIEF PHARMACIST—400 bed private hospital. Duties include filling inpatient, outpatient, and clinic medications, teaching pharmacology to student nurses, and routing hospital compounding. Must be registered in Ky. Forty hour week, vacation, and retirement. PO-197

STAFF PHARMACIST—700 bed general hospital. Duties include filling prescriptions for inpatients and outpatients. B. S. required. Must be registered or eligible for licensure in Ill. PO-196

CHIEF PHARMACIST—300 bed hospital located in Va. Pharmacist will have responsibility of organizing dept., purchasing initial stocks, planning policies and procedures, establishing formulary, and serving on the Pharmacy and Therapeutics Committee. Forty hour week, vacation, and sick leave. PO-195

STAFF PHARMACIST—790 bed hospital. Duties include handling and filling of inpatient and outpatient departmental orders, outpatient prescriptions and bulk manufacturing. Must be registered or eligible for registration in Ohio. Male preferred. Forty hour week, vacation, holidays, and pension plan. PO-194

STAFF PHARMACIST—360 bed teaching hospital. Dispensing outpatient prescriptions, inpatient medications, possibly some teaching of pharmacology, research activities and some manufacturing. Applicant must have B. S. Degree and be able to reciprocate to Vt. Forty hour week, vacation, insurance, and retirement benefits. PO-192

ASST. CHIEF PHARMACIST—225 bed general hospital in Hawaii. Assist chief pharmacist; charge of dept. in chief pharmacist's absence. Must be eligible for licensure in Hawaii. Forty hour week, vacation, holidays, annual sick leave, insurance, and retirement plans. PO-191

STAFF PHARMACIST—300 bed general hospital. Filling inpatient and outpatient orders, filling narcotic orders, assume responsibility of prepackaging and filling ward stock orders. Must be registered in Ohio. Female preferred between the age of 25-40. Forty hour week, vacation, paid holidays, sick leave, and insurance. PO-190

CHIEF PHARMACIST—2300 bed mental hospital. Pharmacist will have complete charge of pharmacy, drug orders, stocking, dispensing, compounding, necessary records, and other pharmacy duties. Must be licensed in Ohio. Forty hour week, vacation, holidays, insurance, retirement plan, and sick leave benefits. PO-189

CHIEF PHARMACIST—500 bed general county hospital. California licensure and Civil Service Examination required. PO-188

CHIEF PHARMACIST—212 bed general hospital located in Iowa. Will be responsible for entire pharmacy operation, purchase of drugs and general medical supplies, and will assist in in-service training of registered nurses. Must be registered with hospital experience preferred. Forty hour week, vacation, holidays, sick days, and insurance. PO-187

STAFF PHARMACIST—325 bed general hospital located in Pa. Duties include filling requisitions from the various nursing stations for floor drugs and completing specific prescriptions to patients. Forty hour week, vacation, and group hospitalization. PO-186

STAFF PHARMACIST—400 bed general hospital located in Mich. Excellent opportunity in an expanding pharmacy program. Liberal benefits. PO-185

ASST. CHIEF PHARMACIST—155 bed general hospital. Duties include filling inpatient prescriptions and assuming full responsibility

of pharmacy in the absence of chief pharmacist. Applicant must have B. S. in Pharmacy, be eligible for registration in Ga., and be willing to work on weekends. Forty-four hour week, vacation. PO-184

PHARMACIST—320 bed general hospital located in Pa. To assume direct supervision of the central sterile supply dept., attend meetings concerning central sterile supply, and be responsible for the processing of sterile material and issuing of oxygen. Must have B. S. and supervisory experience of a central sterile supply, or be willing to learn central supply supervision. Forty hour week, vacation. PO-182

CHIEF PHARMACIST—312 bed nonprofit community hospital. Male or female with hospital pharmacy experience. Must be qualified and eligible for licensure in Va. Forty to forty-four hour week, vacation, and insurance plans. PO-181

CHIEF PHARMACIST—450 bed general medical center. Responsible for complete operation of pharmacy with large outpatient service; supervisory ability needed, experience in developing a hospital formulary required, and must be interested in developing a high level professional service. Will work closely with medical staff and will train personnel. Requirements: Male, B. S., minimum two years' experience preferably with internship in hospital pharmacy, must be licensed or eligible for licensure in Calif. Forty hour week, four weeks' vacation. PO-180

CHIEF AND STAFF PHARMACISTS—180 bed general hospital. Duties include compounding prescriptions for hospital patients as well as take-home prescriptions, ordering and pricing drug items. Must be eligible for licensure in Calif. Forty hour week, vacation, insurance, sick leave, and holidays. PO-179

PHARMACIST—Must be registered for 154 bed Government general hospital primarily for the care of Samoan people. Complete charge of the pharmacy, responsible for dispensing, charges, inventory and ordering through local Medical Supply Dept. Forty hour week with occasional after-hour calls. Free medical and hospital care. Transportation furnished. Ten weeks' paid leave at the end of two-year contract. Renewable with increase if mutually agreeable. Male or female, single person preferred. Write airmail giving training and experience to: Personnel Officer, Government of American Samoa, Pago Pago, American Samoa.

CHIEF PHARMACIST—264 bed general hospital located in Texas. Plans and directs pharmacy policies, compounds and dispenses medicines, purchases supplies and materials, maintains records, and prepares periodical reports. Must be eligible or have M. S. degree. Forty hour week, 2 weeks' vacation, retirement, sick leave, and insurance plans. PO-177

STAFF PHARMACIST—Outstanding opportunity in large, well-known hospital in Midwest. Duties include filling prescriptions and floor supply, and some bulk compounding. Eligible for registration in Minn. Hospital experience preferred. PO-173

PHARMACIST—60 bed hospital located in southwest Colorado needs services of a competent pharmacist. Generous benefits include meals while on duty. Male or female. Excellent quarters available to a single female at very nominal fee in new nurse residency. PO-172

PHARMACIST—800 bed general hospital. Compounds and dispenses medications, sells proprietary medicines, sundries and allied supplies to both in and outpatients. Must be licensed in Indiana or eligible for licensure. Fifty hour week, vacation, retirement, and liberal employee discounts. PO-171

STAFF PHARMACIST—290 bed general medical and surgical city hospital. Duties include compounding, dispensing, manufacturing, and assisting in the purchasing of supplies. Prepares reports and maintains records. Furnishes information concerning medications to physicians and nurses. In absence of associate pharmacist will assist with special duties as assigned by chief pharmacist. Male or female between 23-45 years of age. Ohio registration required. Hospital pharmacy internship preferred. Forty hour week, vacation, sick leave, retirement plan, holidays, and insurance. PO-170

STAFF PHARMACIST—200 bed general hospital. Duties include compounding, dispensing, and manufacturing. Applicant must have B. S. in Pharmacy and be registered in Conn. Recent graduate acceptable. Forty-four hour week, vacation, pension plan, and hospitalization. PO-168

ASST. CHIEF PHARMACIST—102 bed general hospital located in Oregon. Pleasant surroundings in college city of 8,000-20,000 students. Male or female. Must be registered. Forty hour week, vacation, holidays, and sick days. PO-166

ASST. CHIEF PHARMACIST—350 bed general hospital. Assist in training and supervision of employees and in plans and projects of dept. Direct dept. in absence of chief pharmacist. Registration in Ohio and B. S. Degree required. Only male considered, must be over 21 years of age. Forty hour week, vacation, holidays, hospitalization, and sick leave. PO-165

STAFF PHARMACIST—100 bed general hospital located in Texas. Assume personal responsibility for accurate filling of prescriptions and supplies, assist in inspecting drugs in nursing stations, replace stock taken from night emergency container, inspect and refill ophthalmic solution trays from operating room, emergency room, and central supply. Female preferred. Must be registered or eligible for registration in Texas. Forty hour week, vacation, paid holidays, and sick leave. PO-164

ASST. CHIEF PHARMACIST—280 bed general hospital. Duties include filling prescriptions and medication orders from various units, supervise pharmacy clerks, assume administrative responsibility when chief pharmacist is absent. Forty-four hour week, sick leave, and paid holidays. Must be registered in Ill. PO-161

CHIEF PHARMACIST—103 bed general hospital. Purchasing, receiving and issuing of pharmacy supplies. Taking inventory once a year. Filling out various reports necessary to operation of dept., etc. Must be registered in Wash. State. Forty hour week, vacation, holidays, sick leave, and insurance. PO-158

STAFF PHARMACIST—269 bed nonprofit general hospital located in Calif. Duties include filling ward orders, individual prescriptions, outpatient prescriptions and narcotic orders. Applicant must have B. S. in Pharmacy, one year's experience or preferably hospital pharmacy internship. Willingness to work weekends and nights as required. Male or female. Forty to forty-eight hour week, vacation, holidays, sick leave, and insurance plan. PO-157

CHIEF PHARMACIST—190 bed general hospital located in Wis. Pharmacist wil have complete control of the pharmacy, responsible for dispensing, charges, inventory and purchasing. Work with medical staff to formulate policies for dept. with administrative approval. Capable of cooperating with the medical staff, helping the medical satff keep abreast of advances in the field, and guiding and directing the nursing staff in their usage of drugs. Thirty-six to forty-four hour week, vacation, pension plan, insurance, and sick leave. Must be registered in Wis. PO-156

STAFF PHARMACIST—215 bed general hospital. Compound and dispense drugs, manufacture pharmaceuticals and assist in all other pharmaceutical duties in the pharmacy. B. S. required. Must be eligible for licensure in Pa. Forty hour week, vacation, holidays, sick leave, and merit salary increases. PO-152

STAFF PHARMACISTS—Unique, new 400 bed general private hospital where pharmacists join the doctor-nurse team by working in a dispensing unit location on each 100 bed nursing unit or in the central pharmacy. The dispensing unit personnel have responsibility for providing drugs, oxygen, dressing trays I.V. solutions and similar items. A total of sixteen staff pharmacists is required to staff the hospital. Applicants must be eligible for registration in Calif. Excellent opportunity; generous benefits. PO-148

STAFF OR ASSISTANT CHIEF PHARMACIST—150 bed general hospital located in New Mexico. Generous benefits. PO-134

STAFF PHARMACIST—75 bed general, private hospital located in Ind. State registration required. Male or female. PO-131

CHIEF PHARMACIST—185 bed private nonprofit hospital located in Va. Prefer applicant with hospital pharmacy internship and one year's experience. PO-126

ASST. CHIEF PHARMACIST—425 bed general hospital. Duties include dispensing and supervision of special projects. Prefer male applicant with internship in hospital pharmacy. Unique opportunity to obtain experience. PO-115

STAFF PHARMACIST—500 bed general hospital located in Okla. B. S. required. Forty hour week. PO-95

ASST. CHIEF PHARMACIST—315 bed general hospital. Registration in Iowa required. Experience desirable. Forty hour week, vacation. PO-92

ASST. CHIEF PHARMACIST—237 bed general hospital in West Virginia. Female desired. Forty-four hour week, vacation. PO-77

ASST. CHIEF PHARMACIST—Large voluntary hospital located in Brooklyn. Must be eligible for registration in N. Y. Supervisory ability needed. Thirty-five hour week, vacation, sick leave, and holidays. PO-51

positions wanted

CHIEF PHARMACIST—Male, single. Obtained Pharm. D. Degree in 1957 at the University of Southern Calif. Twelve years' hospital pharmacy experience. Registered in Minn. and Calif. Prefers to locate in Minneapolis, Minn. PW-249

STAFF OR CHIEF PHARMACIST—Male, married. Obtained B. S. in 1959 at Medical College of South Carolina. Will complete hospital pharmacy internship in June, 1960. Registered in S. C. Prefers to locate in Pa., Va., or N. C. PW-248

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Obtained B. S. in 1954 at South Dakota State College. Two years' hospital pharmacy experience. Will locate anywhere. Registered in S. D. PW-247

STAFF PHARMACIST—Male, married. Will receive B. S. in June, 1960 at Philadelphia College of Pharmacy and Science. One year's hospital pharmacy experience. Prefers to locate in Philadelphia. PW-246

STAFF OR ASST. CHIEF PHARMACIST—Applicant has held government position of Director of Medical Services in Sierra Leone, West Africa since 1958. Holds B. S. Degree in Pharmacy from Drake University and has taken special courses in Parenteral Products and Radioisotope Techniques at Philadelphia College of Pharmacy. Served hospital pharmacy internship at University of Arkansas Medical Center. Additional hospital pharmacy experience in England. Registered in Iowa. PW-245

CHIEF PHARMACIST—Male, married. Ph.C. Degree received at Ohio State College of Pharmacy. Twelve years' hospital pharmacy experience. Will locate anywhere. Registered in Ohio and Hawaii. PW-244

CHIEF PHARMACIST—Male, married. Obtained B. S. in 1953 at Ohio Northern University. Seven years' hospital pharmacy experience. Will locate anywhere. Registered in Ohio. PW-243

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Obtained M. S. in 1959 at the University of Nebraska. Served hospital pharmacy internship. Three years' hospital pharmacy experience. Will locate anywhere. Registered in Nebr. and Mich. PW-242

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Will obtain M. S. in June, 1960, at the State University of Iowa. Serving hospital pharmacy internship. Prefers to locate in the East. PW-239

STAFF OR ASST. CHIEF PHARMACIST—Male, married. Obtained B. S. in 1950. Presently working for M. S. Degree at the University of Maryland. Two years' hospital pharmacy experience. Prefers to locate in the East. Registered in Md. PW-238

DIRECTOR OF PHARMACY SERVICES—Male, single. Received B. S. in 1956 at the University of California. Served hospital pharmacy internship. Four years' hospital pharmacy experience. Registered in Calif. Prefers to locate in Calif. PW-237

ASST. CHIEF OR CHIEF PHARMACIST—Male, single. Obtained B. S. at South Dakota State College in 1951. Hospital experience. Will locate anywhere. PW-236

ASST. PHARMACIST—Male, single. Obtained B. S. at Xavier University in May 1959. Will locate anywhere. Registered in La. PW-235

STAFF OR CHIEF PHARMACIST—Male, married. Obtained B. S. at St. Louis College of Pharmacy in 1937. Served hospital pharmacy internship. Three years' hospital pharmacy experience. Prefers to locate in Midwest. Registered in Mo. PW-234

ASST. CHIEF OR CHIEF PHARMACIST—Male married. Obtained M. S. at St. Louis College of Pharmacy and Allied Sciences in January, 1960. Served hospital pharmacy internship. Eighteen months' hospital pharmacy experience. Prefers to locate in the Midwest. Registered in Mo. PW-233

PHARMACIST—Female, single. Will obtain B. S. at the State University of Iowa in June, 1960. Prefers to locate in the East. PW-232

ASST. CHIEF OR CHIEF PHARMACIST—Male, single. Will receive M. S. in Hospital Pharmacy and will complete hospital pharmacy internship in June. Military requirements fulfilled. Prefers Eastern section of U.S., but willing to locate anywhere. Registered in Ga. and Md. PW-231

CHIEF PHARMACIST—Male, married. Obtained B. S. at Massachusetts College of Pharmacy in 1943. Nine years' hospital pharmacy experience. Prefers to locate in East. Registered in Conn. and Mass. PW-230

PHARMACIST—Male, married. B. S. received at Howard College of Pharmacy in 1956. Served hospital pharmacy internship. Two years' hospital pharmacy experience. Prefers to locate in Fla. Registered in Fla. and Ala. PW-227

PHARMACIST—Female, single. M. S. received at the University of Maryland in 1951. Served hospital pharmacy internship. Five years' hospital pharmacy experience. Prefers to locate in N. J. Registered in Pa. and Mo. PW-225

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. B. S. received at Detroit Institute of Technology in 1950. Four years' hospital pharmacy experience. Prefers to locate in Mich. Registered in Mich. PW-224

CHIEF PHARMACIST—Male, married. B. S. received at the University of Wisconsin in 1957. Four years' hospital pharmacy experience. Prefers to locate in Wis. Registered in Wis. PW-222

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. Received B. S. at Medical College of South Carolina in 1950. Four years' hospital pharmacy experience. Prefers Southeast section of U.S. Registered in N. C. and S. C. PW-221

CHIEF PHARMACIST—Male, single. Received M. S. at University of Michigan in 1957. Six years' hospital pharmacy experience. Served hospital pharmacy internship. Will locate anywhere. Registered in Mich. and Ohio. PW-220

CHIEF PHARMACIST—Male, married. Will receive M. S. in June, 1960, at the State University of Iowa. Served hospital pharmacy internship. Registered in Iowa. Prefers to locate in the northern Midwest. PW-215

ASST. CHIEF OR CHIEF PHARMACIST—Male, married. B. S. received in 1954 at the Southwestern State College in Oklahoma. Served hospital pharmacy internship. Three years' hospital pharmacy experience. Registered in Okla., prefers to locate in Southwest. PW-214

CHIEF PHARMACIST—Male, married. M. S. received from Philadelphia College of Pharmacy and Science in 1958. Served hospital pharmacy internship. Four years' hospital pharmacy experience. Presently completing military obligations. Will locate anywhere and will be available after July, 1960. Registered in Ohio. PW-210

CHIEF PHARMACIST—Male, married. M. S. received at Philadelphia College of Pharmacy and Science in 1957. Served hospital pharmacy internship. Over four years' hospital pharmacy experience. Registered in Nebr., Ky., Iowa, and Pa. Prefers Midwest. PW-204

STAFF PHARMACIST—Female, single. B. S. Seven years' hospital pharmacy experience. Southwest section of country preferred. Registered in Ala. and Ga. PW-199

ASST. CHIEF OR CHIEF PHARMACIST—Male. B. S. received in 1954. Desires to locate in Mich., Ohio or Ill. Registered in Mich. PW-177

PHARMACIST—Female. Graduate of the University of Idaho, 1954. Registered in Ill. Hospital experience. Prefers Chicago area. PW-166

CHIEF OR ASST. CHIEF PHARMACIST—Female. B. S. and M. S. Purdue University. Ten years' hospital pharmacy experience. Registered in Ind. and Ky. PW-164

ASST. CHIEF PHARMACIST—Male, single. Registered in N. Y. and Vt. Served hospital pharmacy internship, now employed part-time staff pharmacist. Prefers Eastern part of country. Has M. S., four years' hospital pharmacy experience. PW-154

CHIEF PHARMACIST—Male, married. B. S. Ten years' hospital pharmacy experience. Registered in Mass., Ill., Mo., Ky., Tenn., and Va. PW-150

PHARMACIST—Male, single. B. S. received in June, 1959. Prefers to locate in East. PW-149

ASST. CHIEF OR CHIEF PHARMACIST—Single, male. Registered in D. C., Ill., Md., and Pa. Graduate of Pittsburgh in 1953, experience in research. Prefers North and East. PW-148

ASST. DIRECTOR OR DIRECTOR OF PHARMACY SERVICES—Male, single. B. S. Retail and five years' hospital experience. Registered in Ill. PW-119

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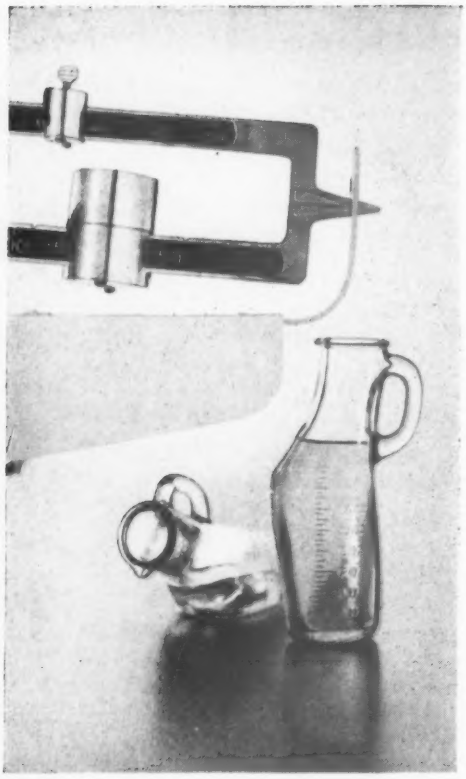

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